

State of New Jersey  
James E. McGreevey, Governor

# 2001 Fish IBI Summary Report



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Bradley M. Campbell, Commissioner

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# 2001 IBI SUMMARY REPORT

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## INTRODUCTION

Monitoring the health of aquatic systems is a critical component of watershed management. Historically, aquatic systems were monitored primarily through chemical means. Unfortunately, chemical monitoring provides only a “snapshot” of conditions at the time of sampling and may fail to detect acute pollution events (e.g. runoff from heavy rain, spills) and non-chemical pollution (e.g. habitat alteration). In order to address the shortcomings of chemical monitoring, the New Jersey Department of Environmental Protection supplements chemical monitoring with biological monitoring. Biological monitoring is based on the premise that biological communities are shaped by the long-term conditions of their environment and more accurately reflect the health of an ecosystem.

The monitoring of stream fish assemblages is an integral component of many water quality management programs for a variety of reasons (See Table 1), and its importance is reflected in the aquatic life use support designations adopted by many states. Narrative expressions such as "maintaining coldwater fisheries", "fishable", or "fish propagation" are prevalent in many state standards. Here in New Jersey, surface water quality criteria are closely aligned with descriptors such as *trout production*, *trout maintenance* and *non-trout* waterways. Assessments of fish assemblages can adequately evaluate biological integrity and protect surface water quality. Fish bioassessment data quality and comparability are assured through the utilization of qualified fisheries professionals and consistent methods (Plafkin et al. 1989).

**TABLE 1**

### ADVANTAGES OF USING FISH AS INDICATORS

1. Fish are good indicators of long-term (several years) effects and broad habitat conditions because they are relatively long-lived and mobile (Karr et al. 1986).
2. Fish assemblages generally include a range of species that represent a variety of trophic levels (omnivores, herbivores, insectivores, planktivores, piscivores). They tend to integrate effects of lower trophic levels; thus, fish assemblage structure is reflective of integrated environmental health.
3. Fish are at the top of the aquatic food chain and are consumed by humans, making them important subjects in assessing contamination.
4. Fish are relatively easy to collect and identify to the species level. Most specimens can be sorted and identified in the field and released unharmed.
  - Environmental requirements of common fish are comparatively well known.
  - Life history information is extensive for most species.
  - Information on fish distributions is commonly available.
5. Aquatic life uses (water quality standards) are typically characterized in terms of fisheries (coldwater, coolwater, warmwater, sport, forage).
  - Monitoring fish assemblages provides direct evaluation of "fishability", which emphasizes the importance of fish to anglers and commercial fisherman.
6. Fish account for nearly half of the endangered vertebrate species and subspecies in the United States (Warren and Burr 1994).

The general methodology currently employed in the compilation of these studies and reports is the Rapid Bioassessment Protocol described in Barbour et al. (1999) with some modifications for regional conditions (Kurtenbach 1994). The principal evaluation mechanism utilizes the technical framework of the *Index of Biotic Integrity (IBI)*, a fish assemblage approach developed by Karr (1981). The IBI incorporates the zoogeographic, ecosystem, community and population aspects of the fish assemblage into a single ecologically based index. Calculation and interpretation of the IBI involves a sequence of activities including: fish sample collection, data tabulation, and regional modification<sup>1</sup> and calibration of metrics and expectation values. This concept has provided the overall multimetric index framework for rapid bioassessment in this document.

Data provided by the IBI will become another component of the DEP's suite of environmental indicators. The data will help to measure water quality use attainment and the Department's success in attaining the Clean Water Act goal of "fishable" waters as elaborated in the Department's integrated 305(b) and 303(d) Integrated Assessment Report. IBI data will also be used to develop biological criteria, prioritize sites for further studies, provide biological impact assessments, and assess status and trends of the state's freshwater fish assemblages. Currently, IBI data collected from northern New Jersey is being evaluated for use in a "weight of evidence" approach to nominate candidate waters for upgrade to a Category One classification (NJAC 7:9B).

## FIELD COLLECTION PROCEDURES

Primary objectives of the fish collections are to obtain samples with representative species and abundances, at a reasonable level of effort. Sampling effort is standardized by using similar stream lengths, collection methods, and habitat types. Stream segments selected for sampling must have a minimum of one riffle, run, and pool sequence to be considered representative.

**TABLE 2**

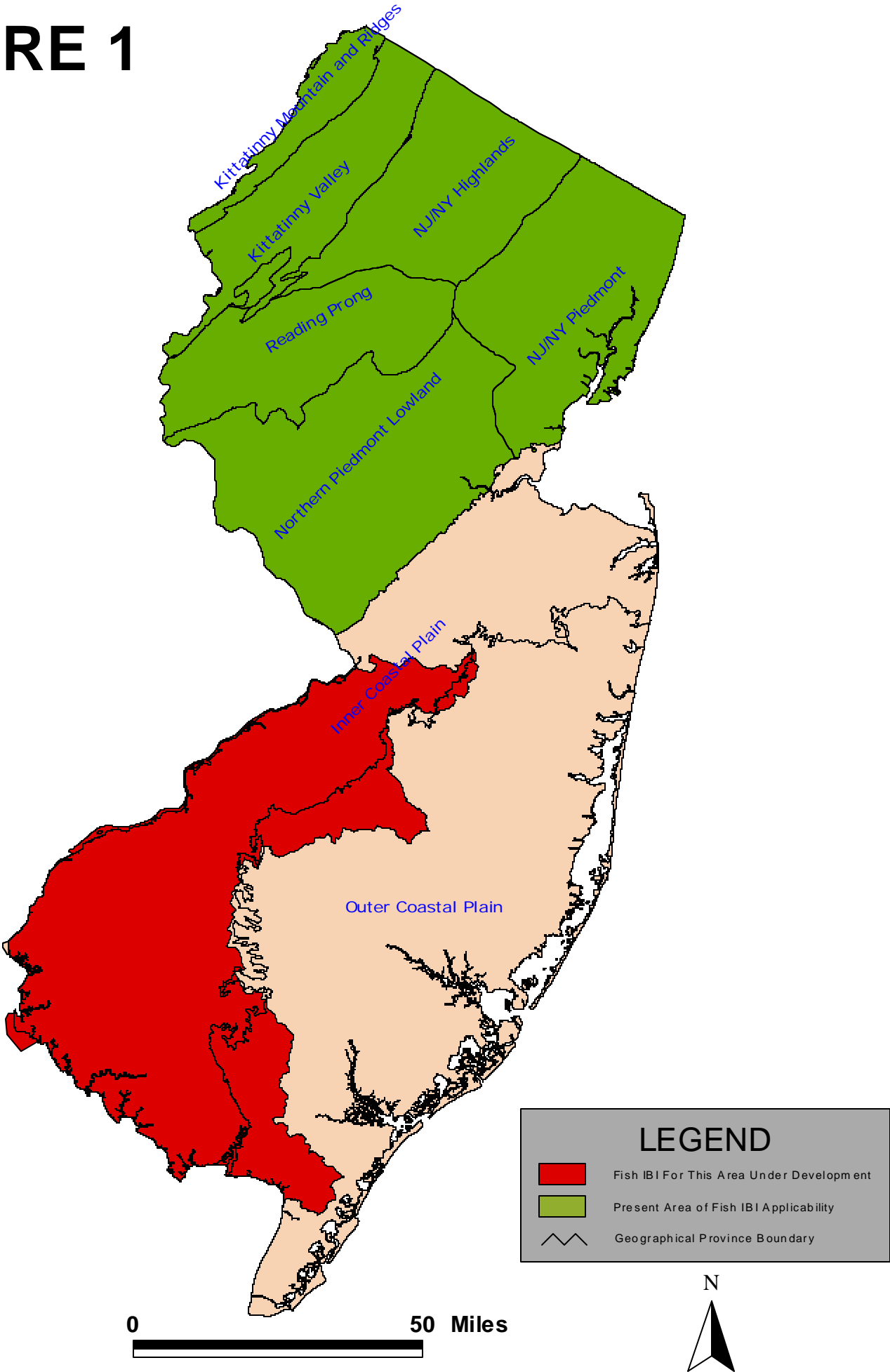
### REQUIREMENTS FOR FISH SAMPLING BASED ON STREAM SIZE

	<b>A</b>	<b>B</b>	<b>C</b>
Stream Size	Moderate to large streams and rivers (5 <sup>th</sup> order or greater)	Wadeable streams (3 <sup>rd</sup> and 4 <sup>th</sup> order)	Headwater streams (1 <sup>st</sup> and 2 <sup>nd</sup> order)
Sampling Distance (meters)	500 m	150 m	150 m
Electrofishing Gear	12' boat	2 Backpacks or barge electrofishing unit	1-2 Backpack electrofisher(s)
Power Source	5000 watt generator	24 volt battery or 2500 watt generator	24 volt battery

Streams with drainage areas less than 5 square miles are presently excluded from IBI scoring because of naturally occurring low species richness. Often streams classified as trout production waters fall into this category. More appropriate assessment methods for these streams include the measurement of trout abundance and/or young of the year production. Benthic macroinvertebrate assessments are also a viable alternative. In addition, atypical habitats such as dams and mouths of tributaries are avoided, unless the intent of the study is to determine the influence these habitats have on the fish assemblage. Most often, sampling atypical habitats results in the collection of fish species not represented in typical stream reaches. Sampling intermittent streams should also be avoided. These streams require the development of a separate set of IBI scoring criteria.

<sup>1</sup> The IBI methodology presently being used in these studies was modified from Plafkin et al. (1989) to meet the regional conditions of New Jersey (not all of the state, however, is covered, **see Fig. 1**) based on work by Kurtenbach (1994). It should be noted, however, that an enumeration of fish assemblages, regardless of whether an IBI is calculated or not, is still a useful *environmental indicator* capable of providing stand alone information useful to determine whether the affected stream(s) are capable of meeting the narrative criteria of "fishable".

FIGURE 1



Fish are sampled primarily with electrofishing gear using pulsed direct current (DC) output. This method of collection has proved to be the most comprehensive and effective single method for collecting stream fishes. Direct current is safer, more effective, especially in turbid water, and less harmful to the fish. In waters with low conductivity (less than 75  $\mu\text{mhos/cm}$ ) it may be necessary to use an AC unit (Lyons 1992). Selection of the appropriate electrofishing gear is dependent on stream size (Table 2). A typical sampling crew consists of four to seven people (Fig. 2), depending on the gear being utilized. A minimum of two people are required for netting the stunned fish. Electrofishing is conducted by working slowly upstream for 150 meters and placing the electrodes in all available fish habitat. Stunned fish are netted at and below the electrodes as they drift downstream. Netters attempt to capture fish representing all size classes. All fish captured are immediately placed in water filled containers strategically located along the stream bank in order to reduce fish mortality.

**FIGURE 2**

### **TYPICAL ELECTROSHOCKING OPERATION**



Sampling time generally requires 1.5 to 2 hours per station. This includes the measurement of chemical and physical parameters. Sampling is conducted during daylight hours, June through early October, under normal or low flows, and never under atypical conditions such as high flows or excessive turbidity caused by heavy precipitation. Fish collections made in the summer and early fall are easier, safer and less likely to disturb spawning fish.

### **SAMPLE PROCESSING**

Fish are identified to the species level, counted, examined for disease and anomalies, measured (game fish), released and recorded on fish data sheets in the field. The sampling protocol employed is ineffective in capturing a

representative sample of smaller fish because they are difficult to see and tend to congregate. Consequently, only fish greater than 25 mm in length are counted. Reference specimens and difficult to identify individuals are placed in jars containing 10 percent formaldehyde and later confirmed at the laboratory using taxonomic keys; (Werner 1980; Eddy and Underhill 1983; Smith 1985; Page and Burr 1991; Jenkins and Burkhead 1993). Species particularly difficult to identify are forwarded to fisheries experts outside the BFBM (at present the Philadelphia Academy of Natural Sciences) for confirmation.

## MEASUREMENT OF PHYSICAL AND CHEMICAL PARAMETERS

Physical and chemical measurements (e.g. pH, conductivity, temperature, depth) of existing stream conditions are recorded on physical characterization/water quality field data sheets and later summarized.

## HABITAT ASSESSMENT

Habitat assessments are conducted at every sampling site and all information is recorded on field sheets (Barbour et al. 1999). Habitat assessments provide useful information on probable causes of impairment to instream biota when water quality parameters do not indicate a problem. The habitat assessment consists of an evaluation of the following physical features along the 150 meter reach: substrate, channel morphology, stream flow, canopy and stream side cover. Individual parameters within each of these groups are scored and summed to produce a total score, which is assigned a habitat quality category (**Appendix 3**).

## QUALITY ASSURANCE/QUALITY CONTROL

A Quality Assurance/Quality Control plan is approved by the Office of Quality Assurance prior to sampling. A copy of this plan is available by contacting the BFBM.

## DESCRIPTION AND DISCUSSION OF THE IBI<sup>2</sup>

Once the fish from each sample collection have been identified, counted, examined for disease and anomalies, and recorded, several biometrics are used to evaluate biological integrity. Fish assemblage analysis is accomplished using a regional modification of the original IBI (Karr 1981), developed by Kurtenbach (1994). Consistent with Karr et al. (1986), a theoretical framework is constructed of several biological metrics that are used to assess a fish assemblage's richness, trophic composition, abundance and condition, and compared to fish assemblages found in regional reference streams<sup>3, 4</sup>. The modified IBI (New Jersey version) uses the following ten biometrics: 1) total number of fish species, 2) number of benthic insectivorous species, 3) number of trout and sunfish species, 4) number of intolerant species, 5) proportion of individuals as white suckers, 6) proportion of individuals as generalists (carp, creek chub, goldfish, fathead minnow, green sunfish and banded killifish), 7) proportion of individuals as insectivorous cyprinids, 8) proportion of individuals as trout or proportion of individuals as piscivores (top carnivores) - excluding American eels, 9) number of individuals in the sample and 10) proportion of individuals with disease or anomalies (excluding blackspot disease). **See Appendices 1 and 2.**

<sup>2</sup> Narrative for this section taken largely from Kurtenbach (1994).

<sup>3</sup> For regional reference conditions Kurtenbach (1994) used historical fisheries data collected by the New Jersey Division of Fish, Game and Wildlife (unpublished) at 126 stream sites located in the Delaware, Passaic, and Raritan River watersheds. The fish collection methods and the stream lengths sampled in these historical studies were compatible with Kurtenbach's work.

<sup>4</sup> Trophic guilds, pollution tolerances and origins (native or introduced) of each fish species utilized by Kurtenbach to calculate the IBI were assigned using several fisheries publications (Stiles, 1978; Smith, 1985; Hocutt et al. 1986; Karr et al. 1986; Ohio EPA, 1987; Miller et al. 1988).



Quantitative scoring criteria were developed for each biometric based upon the degree of deviation; 5 (none to slight), 3 (moderately), and 1 (significantly) from appropriate ecoregional reference conditions. Scores for the individual biometrics at each sampling location are summed to produce a total score, which is then assigned a condition category. The maximum possible IBI score is 50, representing excellent biological integrity. A score of less than 29 indicates a stream has poor biological integrity. 10 is the lowest score a site can receive. Further descriptions of all of the metrics used in the IBI calculations are presented below:

## SPECIES RICHNESS AND COMPOSITION

Four biometrics require the use of Maximum Species Richness (MSR) lines. MSR lines relate species richness to stream size and environmental quality. For any given stream, species richness is expected to increase with higher environmental quality. Additionally, in a stream with a given level of environmental quality, species richness should increase with stream size. Thus, large sized streams with good water quality should have significantly more species than a small, poor quality stream. MSR lines (See Appendix 3) were developed to show the relationship between species richness and waterbody size in New Jersey. Using the procedure described in Karr et al. (1986), MSR lines for each richness metric were drawn by Kurtenbach (1994) with slopes fit by eye to include 95% of the data points. The area under the MSR line is trisected by two diagonal lines.

Points located near the MSR line represent species richness approaching that expected for an unimpacted stream. Points falling within the lowest trisected area, furthest from the MSR line, represent the greatest deviation from an ecoregional reference condition. For example, using the “total number of fish species” graph in Appendix 3, a sample collection resulting in the capture of five total fish species in a stream with a drainage area of 10 square miles, would receive a score of three and have an intermediate deviation from the expected condition.

### 1. Total number of fish species:

This metric is simply a measure of the total number of fish species identified from a sample collection. A reduction of taxonomic richness may indicate a pollution problem (e.g., organic enrichment, toxicity) and/or physical habitat loss. Fish species with the least tolerance to environmental change, typically are the first to become absent when water degradation occurs. Although freshwater fish species richness in New Jersey is less than half that of the Midwest region where the IBI was first developed (Karr et al. 1986; Ohio EPA 1987; Lyons 1992), effectiveness of this metric is comparable to regions with richer fish faunas.

### 2. Number of benthic insectivorous species:

This metric is a modification of several metrics used in the original IBI (Karr 1981). Darter and sucker species make up a relatively small component of the New Jersey fish fauna. However, several other benthic species require clean gravel or cobble substrate for reproduction and/or living space. Degradation of this habitat from siltation is often reflected by a loss of benthic species richness (Karr et al. 1986) and abundance (Berkman and Rabeni 1987). Several benthic fish require quiet pool bottoms and may decline when benthic oxygen depletion occurs (Ohio EPA 1987). Further, reductions of some benthic insectivorous fish may indirectly indicate a toxics problem. Benthic macroinvertebrates are an important food source for benthic insectivorous fish and their sessile mode of life make them particularly susceptible to toxicant effects.

### 3. Number of trout and sunfish species:

This metric was adopted as a hybrid for warmwater and coldwater streams. The metric is similar to that used in a combined coldwater-warmwater version of an IBI developed in Ontario (Steedman 1988), but designed for high-gradient rather than low gradient streams. In New Jersey, sunfish are a depauperate group in small streams with high gradient and are often replaced by trout. Both sunfish and trout are water-column species sensitive to habitat degradation and loss of instream cover (Gammon et al. 1981; Angermeier 1983). In coldwater streams where sunfish are typically absent, trout fill a similar ecological

niche and may be used to replace sunfish. Trout are equally, if not more sensitive to habitat degradation. The relationship between trout populations and habitat are well documented (Peters 1967; Hunt 1969; Meehan 1991).

4. Number of intolerant species:

This metric provides a measure of fish species most sensitive to environmental degradation. The absence of some fish species occurs with subtle environmental changes caused by anthropogenic disturbances. Fish species assigned as intolerant should have historical distributions significantly greater than presently occurring populations and be restricted to streams that have exceptional water quality (Karr et al. 1986).

5. Proportion of individuals as white suckers:

The white sucker has been chosen to replace green sunfish as a more regionally appropriate tolerant species in the northeast (Miller et al. 1988; Langdon 1992). In New Jersey, the white sucker is commonly found in small and large streams representing a wide range of water quality conditions. White suckers adapt well to changing environmental conditions and often become dominant at disturbed sites. This metric is generally useful in distinguishing moderately and severely impaired conditions.

## TROPHIC COMPOSITION

Trophic composition metrics, unlike the richness metrics, are scored based on a percentage of the total numbers of individual fish captured. The influence of stream size on trophic composition has not been determined for New Jersey streams. However, in Illinois and Wisconsin streams (Karr 1981; Lyons 1992), trophic composition was not strongly influenced by stream size. Based on these findings, fixed scoring criteria are used on all stream sizes found in New Jersey, with the exception of large rivers.

6. Proportion of individuals as generalists (carp, creek chub, goldfish, fathead minnow, green sunfish and banded killifish):

This metric replaces the omnivore metric used in the original IBI (Karr 1981). Use of the omnivore metric was determined to be inappropriate in New Jersey because omnivores are naturally depauperate. Generalists, as defined here, are species with flexible feeding strategies and broad habitat requirements. Often a shift from predominantly specialist groups to generalist groups occurs as water quality becomes degraded (Leonard and Orth 1986; Ohio EPA 1987). Due to broad feeding and habitat requirements, species included for use in this metric are considered tolerant of environmental degradation.

7. Proportion of individuals as insectivorous cyprinids:

Like many streams found in North America, cyprinids are the dominant insectivorous fish in New Jersey (excluding Pineland streams). A shift from specialized invertebrate feeders to generalist with flexible foraging behaviors often indicates poor conditions associated with water quality and/or physical habitat degradation (Karr et al. 1986). Similar to the benthic insectivore metric, insectivorous cyprinids in some instances, may indirectly measure the effects of toxicity.

8. Proportion of individuals as trout or proportion of individual as piscivores (top carnivores) - excluding American eel (whichever gives higher score):

Streams with slight or moderate water quality impairment generally contain several top predator fish species. In cold water streams of New Jersey, predator fish such as bass and pickerel are depauperate and typically replaced by trout. Thus, a metric is required which measures both groups of top carnivores. A metric fulfilling this requirement is currently used on Vermont streams (Langdon 1992) and has been adopted for use in New Jersey. American eels are excluded from use in this metric. The ubiquity of American eels in streams that have a wide range of water quality and habitat conditions, limits their use as an indicator of aquatic health.

## FISH ABUNDANCE AND CONDITION

### 9. Numbers of individuals in the sample:

This metric measures the abundance of fish captured from a specified area or stream reach and is used to distinguish streams with severe water quality impairment. Like the original IBI (Karr 1981), catch per unit effort is used to score this metric. Severe toxicity and oxygen depletion are examples of perturbations often responsible for extremely low fish abundances.

### 10. Proportion of individuals with disease or anomalies (excluding blackspot disease)

This metric provides a relative measure of the condition of individual fish. Similar to metric nine, this metric is especially useful in distinguishing streams with serious water quality impacts. This metric is intended to detect impacts occurring below subacute chemical discharges or areas highly contaminated by chemicals. A significant relationship between the incidence of blackspot disease and environmental quality has not been established for New Jersey streams. As a result, blackspot disease is excluded from use in this metric.

## FURTHER INFORMATION

The current report summarizes the second year of IBI sampling. By summer 2004, The IBI network will have 100 stations in northern New Jersey (An IBI for southern New Jersey is currently being evaluated). Stations will be visited every five years as part of the Bureau's monitoring efforts.

Reports and data for the first two years of the IBI can be obtained on the Bureau of Freshwater and Biological Monitoring's web page: <http://www.state.nj.us/dep/wmm/bfbm> or by calling 609-292-0427.

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## **SUMMARY OF RESULTS**

# 2001 IBI Sites



## 2001 IBI Sites

Excellent

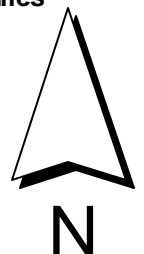
Good

Fair

Major Streams

Watershed Management Areas

20 0 20 Miles

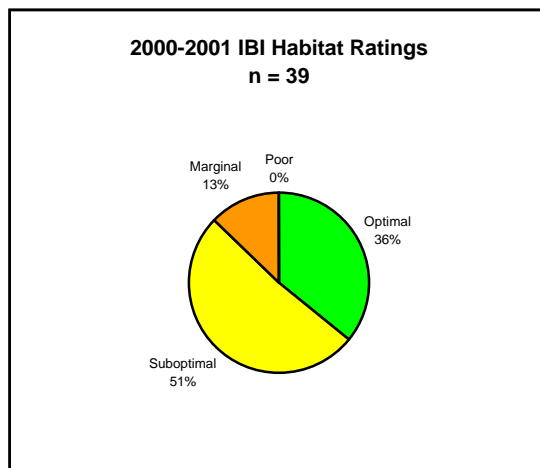
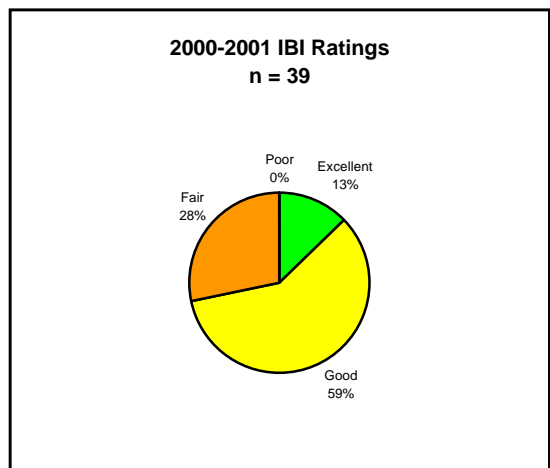
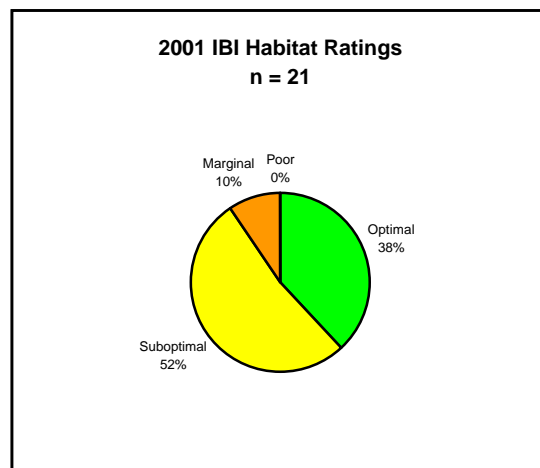
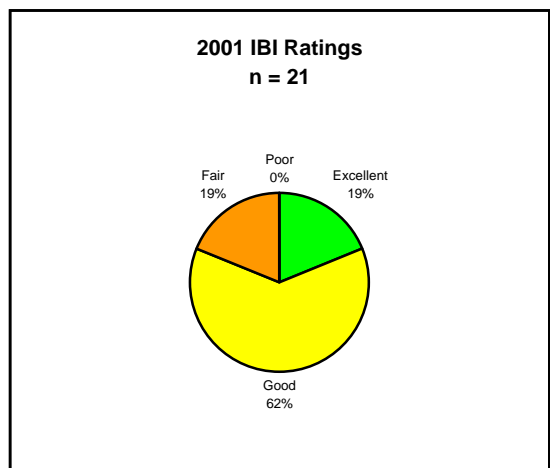


# 2001 Results

FIBI site	Waterbody	IBI Score	IBI Rating	Habitat Score	Habitat Rating
FIBI008	Sidney Brook (Grandin)	46	Excellent	164	Optimal
FIBI011a	Meadow Brook (High Mountain)	42	Good	130	Suboptimal
FIBI021	Rockaway River	34	Fair	163	Optimal
FIBI023	Neshanic River	36	Fair	130	Suboptimal
FIBI024	Passaic River	36	Fair	108	Marginal
FIBI025	Peters Brook	34	Fair	109	Marginal
FIBI026	Nishisakawick Creek	44	Good	167	Optimal
FIBI027	Lockatong Creek	38	Good	134	Suboptimal
FIBI028	Moores Creek	42	Good	132	Suboptimal
FIBI029	Alexauken Creek	38	Good	158	Suboptimal
FIBI030	Stony Brook	40	Good	148	Suboptimal
FIBI031	North Branch Raritan River	42	Good	160	Optimal
FIBI032	Lamington River	44	Good	161	Optimal
FIBI033	Pohatcong Creek	44	Good	145	Suboptimal
FIBI034	Harihokake Creek	40	Good	163	Optimal
FIBI035	Plum Brook	42	Good	158	Suboptimal
FIBI036	Spruce Run	46	Excellent	140	Suboptimal
FIBI037	Drakes Brook	44	Good	178	Optimal
FIBI038	Middle Brook	38	Good	155	Suboptimal
FIBI039	Van Campens Brook	50	Excellent	186	Optimal
FIBI040	West Branch Papakating Creek	46	Excellent	125	Suboptimal



## Summary of IBI Fish and Habitat Ratings for 2001 and 2000-2001 Combined



**Note:** The omission of streams that do not meet IBI habitat criteria (see "Field Collection Procedures") generally precludes streams most likely to receive a poor IBI and habitat score. Consequently, the absence of poorly rated streams should not be interpreted to mean there are no streams in northern New Jersey with impaired fish assemblages.

## **SITE INFORMATION**

## SUMMARY OF RESULTS – FIBI008



1. Stream Name:	Sidney (Grandin) Brook
2. Sampling Date:	08/23/2001
3. Sampling Location:	Sidney Rd. (CR 617) (40 36 49N; 74 55 28W)
4. Municipality	Franklin Twp.
5. County:	Hunterdon
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	5.2
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Excellent (46) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (164) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0324a
AMNET Rating:	2001-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	10.7
Temperature °C.	20
pH	8.38
Conductivity (µmhos/cm)	278
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	33%
18. Discharge (ft. <sup>3</sup> /sec.):	9.9
19. Substrate: (qualitative)	15% Gravel/Sand, 75% Cobble, 10% Silt
20. Habitat Type: (qualitative)	20% Riffle, 60% Run, 20% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	15
23. Total Number of Fish Collected:	480

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI008 08/23/01

SIDNEY BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	123	
Blacknose Dace	<i>Rhinichthys atratulus</i>	112	
Longnose Dace	<i>Rhinichthys cataractae</i>	105	
White Sucker*	<i>Catostomus commersoni</i>	66	
American Eel*	<i>Anguilla rostrata</i>	17	
Largemouth Bass*	<i>Micropterus salmoides</i>	15	2.2 - 4.3
Fallfish	<i>Semotilus corporalis</i>	10	
Green Sunfish*	<i>Lepomis cyanellus</i>	8	2.8 - 5.6
Margined Madtom	<i>Noturus insignis</i>	7	
Redbreast Sunfish*	<i>Lepomis auritus</i>	5	3.5 - 5.4
Bluegill*	<i>Lepomis macrochirus</i>	5	2.6 - 3.3
Creek Chub	<i>Semotilus atromaculatus</i>	3	
Redfin Pickerel*	<i>Esox americanus americanus</i>	2	5.3 - 5.7
Common Shiner	<i>Luxilus cornutus</i>	1	
Brook Trout*	<i>Salvelinus fontinalis</i>	1	13.0

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes



**The presence of this brook trout under summertime conditions is an indicator of the good water quality of Sidney Brook.**

## SUMMARY OF RESULTS – FIBI011a



1. Stream Name:	Meadow Brook
2. Sampling Date:	08/28/2001
3. Sampling Location:	downstream of Belmont Ave. crossing (41 02 59N; 74 17 11W)
4. Municipality	Wanaque Boro.
5. County:	Passaic
6. Watershed Management Area:	3
7. Contributing Drainage Area (Sq. Mi.):	5.6
8. Stream Water Quality Class:	FW2-TP(C1)
9. FIBI Rating:	Good (42) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (130) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.81 mi. upstream of AN0256a
AMNET Rating:	1998-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.8
Temperature °C.	18.5
pH	8.3
Conductivity (µmhos/cm)	275
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	16%
18. Discharge (ft. <sup>3</sup> /sec.):	2.0
19. Substrate: (qualitative)	40% Gravel/Sand, 50% Cobble, 5% Boulder, 5% Silt
20. Habitat Type: (qualitative)	30% Riffle, 50% Run, 20% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	11
23. Total Number of Fish Collected:	338

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI011a 08/28/01

MEADOW BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Creek Chub	<i>Semotilus atromaculatus</i>	165	
Blacknose Dace	<i>Rhinichthys atratulus</i>	41	
Tessellated Darter	<i>Etheostoma olmstedii</i>	36	
White Sucker*	<i>Catostomus commersoni</i>	36	
Brown Trout*	<i>Salmo trutta</i>	25	2.6 - 9.4
Yellow Perch*	<i>Perca flavescens</i>	19	2.0 - 2.6
Fallfish	<i>Semotilus corporalis</i>	8	
Largemouth Bass*	<i>Micropterus salmoides</i>	4	2.6 - 3.1
Eastern Mudminnow	<i>Umbra pygmaea</i>	2	
Bluegill*	<i>Lepomis macrochirus</i>	1	7.9
Brook Trout*	<i>Salvelinus fontinalis</i>	1	9.4

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes





**It is apparent that the hydrological conditions and habitat of Meadow Brook are changing.**



**This bluegill was just one of six fishable species found in Meadow Brook.**



## SUMMARY OF RESULTS – FIBI021



1. Stream Name:	Rockaway River
2. Sampling Date:	06/07/2001
3. Sampling Location:	Knoll Rd. (40 53 31N; 74 22 30W)
4. Municipality	Parsippany-Troy Hills Twp.
5. County:	Morris
6. Watershed Management Area:	6
7. Contributing Drainage Area (Sq. Mi.):	121.2
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Fair (34) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (163) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	1.46 mi. downstream of AN0251
AMNET Rating:	1993-Moderately Impaired; 1998-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.5
Temperature °C.	19.3
pH	6.4
Conductivity (µmhos/cm)	296
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	Partly Open
18. Discharge (ft. <sup>3</sup> /sec.):	207.0
19. Substrate: (qualitative)	30% Gravel/Sand, 70% Cobble
20. Habitat Type: (qualitative)	0% Riffle, 80% Run, 20% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	9
23. Total Number of Fish Collected:	179

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI021 06/07/01

ROCKAWAY RIVER

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Spottail Shiner	<i>Notropis hudsonius</i>	106	
Blacknose Dace	<i>Rhinichthys atratulus</i>	29	
Creek Chub	<i>Semotilus atromaculatus</i>	18	
White Sucker*	<i>Catostomus commersoni</i>	13	
Tessellated Darter	<i>Etheostoma olmsted</i>	8	
Satinfin Shiner	<i>Cyprinella analostana</i>	2	
Bluegill*	<i>Lepomis macrochirus</i>	1	1.0
Green Sunfish*	<i>Lepomis cyanellus</i>	1	4.0
Pumpkinseed*	<i>Lepomis gibbosus</i>	1	1.0

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI023



1. Stream Name:	Neshanic River
2. Sampling Date:	08/03/2001
3. Sampling Location:	along Kuhl Rd. (40 28 39N; 74 50 35W)
4. Municipality:	Raritan Twp.
5. County:	Hunterdon
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	23.1
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Fair (36) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (130) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.94 mi. upstream of AN0333
AMNET Rating:	1994-Moderately Impaired; 1999-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.6
Temperature °C.	21.8
pH	8.3
Conductivity (µmhos/cm)	356
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	50%
18. Discharge (ft. <sup>3</sup> /sec.):	5.3
19. Substrate: (qualitative)	20% Gravel/Sand, 45% Cobble, 10% Boulder, 5% Mud, 5% Silt, 15% Bedrock
20. Habitat Type: (qualitative)	10% Riffle, 65% Run, 25% Pool
21. Other observations:	Rip Rap on Stream Bank
22. Number of Fish Species Identified: (see next page)	23
23. Total Number of Fish Collected:	1393

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI023 08/03/01

NESHANIC RIVER

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
White Sucker*	<i>Catostomus commersoni</i>	522	
Common Shiner	<i>Luxilus cornutus</i>	191	
Tessellated Darter	<i>Etheostoma olmstedii</i>	130	
Redbreast Sunfish*	<i>Lepomis auritus</i>	109	2.4 - 6.5
Spottail Shiner	<i>Notropis hudsonius</i>	91	
Green Sunfish*	<i>Lepomis cyanellus</i>	71	2.2 - 4.6
Rock Bass*	<i>Ambloplites rupestris</i>	61	2.8 - 6.3
Spotfin Shiner	<i>Cyprinella spiloptera</i>	41	
American Eel*	<i>Anguilla rostrata</i>	33	
Blacknose Dace	<i>Rhinichthys atratulus</i>	33	
Banded Killifish	<i>Fundulus diaphanus</i>	25	
Swallowtail Shiner	<i>Notropis procne</i>	17	
Bluegill*	<i>Lepomis macrochirus</i>	14	2.6 - 3.9
Longnose Dace	<i>Rhinichthys cataractae</i>	12	
Pumpkinseed*	<i>Lepomis gibbosus</i>	11	2.8 - 3.1
Satinfin Shiner	<i>Cyprinella analostana</i>	10	
Yellow Bullhead*	<i>Ameiurus natalis</i>	10	3.5 - 8.7
Creek Chubsucker	<i>Erimyzon oblongus</i>	4	
Fathead Minnow	<i>Pimephales promelas</i>	2	
Golden Shiner	<i>Notemigonus crysoleucas</i>	2	
Creek Chub	<i>Semotilus atromaculatus</i>	2	
Largemouth Bass*	<i>Micropterus salmoides</i>	1	3.1
Comely Shiner	<i>Notropis amoenus</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI024



1. Stream Name:	Passaic River
2. Sampling Date:	08/08/2001
3. Sampling Location:	Stonehouse Rd. (40 40 16N; 74 31 33W)
4. Municipality	Long Hill Twp.
5. County:	Morris
6. Watershed Management Area:	6
7. Contributing Drainage Area (Sq. Mi.):	54.3
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Fair (36) (See Appendix 3)
10. Habitat Assessment Rating:	Marginal (108) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	1.07 mi. upstream of AN0224
AMNET Rating:	1992-Non-Impaired; 1999-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.9
Temperature °C.	26.2
pH	8
Conductivity (µmhos/cm)	302
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	50%
18. Discharge (ft. <sup>3</sup> /sec.):	21.8
19. Substrate: (qualitative)	15% Gravel/Sand, 70% Cobble, 15% Silt
20. Habitat Type: (qualitative)	20% Riffle, 70% Run, 10% Pool
21. Other observations:	Retaining Wall/Rip Rap along entire right bank
22. Number of Fish Species Identified: (see next page)	15
23. Total Number of Fish Collected:	829

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI024 08/08/01

PASSAIC RIVER

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	292	
Redbreast Sunfish*	<i>Lepomis auritus</i>	175	1.8 - 5.5
Green Sunfish*	<i>Lepomis cyanellus</i>	140	2.0 - 4.7
Spottail Shiner	<i>Notropis hudsonius</i>	74	
Eastern Mudminnow	<i>Umbra pygmaea</i>	57	
Swallowtail Shiner	<i>Notropis procne</i>	32	
Longnose Dace	<i>Rhinichthys cataractae</i>	16	
Satinfin Shiner	<i>Cyprinella analostana</i>	11	
Margined Madtom	<i>Noturus insignis</i>	10	
Pumpkinseed*	<i>Lepomis gibbosus</i>	8	2.4 - 3.1
Redfin Pickerel*	<i>Esox americanus americanus</i>	6	2.8 - 5.5
Banded Sunfish	<i>Enneacanthus obesus</i>	3	
Creek Chub	<i>Semotilus atromaculatus</i>	2	
White Sucker*	<i>Catostomus commersoni</i>	2	
Chain Pickerel*	<i>Esox niger</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes



**An apparent and significant channel modification (right side of photo) has occurred in the sampled stream reach.**

## SUMMARY OF RESULTS – FIBI025



1. Stream Name:	Peters Brook
2. Sampling Date:	06/14/2001
3. Sampling Location:	Park Ave @ park (40 34 04N; 74 36 20W)
4. Municipality	Somerville Boro.
5. County:	Somerset
6. Watershed Management Area:	9
7. Contributing Drainage Area (Sq. Mi.):	9.5
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Fair (34) (See Appendix 3)
10. Habitat Assessment Rating:	Marginal (109) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.12 mi. upstream of AN0376
AMNET Rating:	1993-Moderately Impaired; 1998-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.1
Temperature °C.	21.6
pH	7.38
Conductivity (µmhos/cm)	740
14. Number of Fish With Anomalies:	1
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	Mostly Open
18. Discharge (ft. <sup>3</sup> /sec.):	1.7
19. Substrate: (qualitative)	10% Gravel/Sand, 80% Cobble, 10% Boulder
20. Habitat Type: (qualitative)	10% Riffle, 80% Run, 10% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	15
23. Total Number of Fish Collected:	392

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.



FIBI025 06/14/01

PETERS BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Redbreast Sunfish*	<i>Lepomis auritus</i>	72	1.2 - 5.9
Swallowtail Shiner	<i>Notropis procne</i>	61	
Green Sunfish*	<i>Lepomis cyanellus</i>	52	2.2 - 4.7
White Sucker*	<i>Catostomus commersoni</i>	44	
Banded Killifish	<i>Fundulus diaphanus</i>	43	
American Eel*	<i>Anguilla rostrata</i>	42	
Tessellated Darter	<i>Etheostoma olmstedii</i>	24	
Pumpkinseed*	<i>Lepomis gibbosus</i>	21	1.6 - 3.7
Blacknose Dace	<i>Rhinichthys atratulus</i>	12	
Common Shiner	<i>Luxilus cornutus</i>	10	
Satinfin Shiner	<i>Cyprinella analostana</i>	4	
Comely Shiner	<i>Notropis amoenus</i>	3	
Smallmouth Bass*	<i>Micropterus dolomieu</i>	2	6.5
Spottail Shiner	<i>Notropis hudsonius</i>	1	
Mummichog	<i>Fundulus heteroclitus</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI026



1. Stream Name:	Nishisakawick Creek
2. Sampling Date:	07/24/2001
3. Sampling Location:	Creek Road @ Frenchtown Park (40 31 41N; 75 03 33W)
4. Municipality	Frenchtown Boro.
5. County:	Hunterdon
6. Watershed Management Area:	11
7. Contributing Drainage Area (Sq. Mi.):	11.2
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Good (44) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (167) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0082
AMNET Rating:	1993-Non-Impaired; 1997-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	12.38
Temperature °C.	21.9
pH	8.46
Conductivity (µmhos/cm)	175
14. Number of Fish With Anomalies:	2
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	46%
18. Discharge (ft. <sup>3</sup> /sec.):	14.8
19. Substrate: (qualitative)	10% Gravel/Sand, 20% Cobble, 70% Boulder
20. Habitat Type: (qualitative)	45% Riffle, 45% Run, 10% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	12
23. Total Number of Fish Collected:	1029

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI026 07/24/01

NISHISAKAWICK CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	591	
Longnose Dace	<i>Rhinichthys cataractae</i>	142	
American Eel*	<i>Anguilla rostrata</i>	85	
White Sucker*	<i>Catostomus commersoni</i>	65	
Common Shiner	<i>Luxilus cornutus</i>	57	
Tessellated Darter	<i>Etheostoma olmstedii</i>	39	
Creek Chub	<i>Semotilus atromaculatus</i>	25	
Cutlips Minnow	<i>Exoglossum maxillingua</i>	15	
Margined Madtom	<i>Noturus insignis</i>	5	
Rainbow Trout*	<i>Oncorhynchus mykiss</i>	3	11.4 - 13.8
Rock Bass*	<i>Ambloplites rupestris</i>	1	5.1
Smallmouth Bass*	<i>Micropterus dolomieu</i>	1	4.7

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes



**One of several healthy rainbow trout found in Nishisakawick Creek**

## SUMMARY OF RESULTS – FIBI027



1. Stream Name:	Lockatong Creek
2. Sampling Date:	07/25/2001
3. Sampling Location:	CR 519 (40 28 16N; 75 01 16W)
4. Municipality:	Kingwood Twp.
5. County:	Hunterdon
6. Watershed Management Area:	11
7. Contributing Drainage Area (Sq. Mi.):	15.2
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Good (38) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (134) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0088
AMNET Rating:	1992-Non-Impaired; 1997-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	6.7
Temperature °C.	26
pH	7.8
Conductivity (µmhos/cm)	194
14. Number of Fish With Anomalies:	2
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Slightly Turbid
17. Average Forest Open Canopy:	Partly Open
18. Discharge (ft. <sup>3</sup> /sec.):	7.5
19. Substrate: (qualitative)	20% Gravel/Sand, 40% Cobble, 30% Boulder, 10% Silt
20. Habitat Type: (qualitative)	20% Riffle, 60% Run, 20% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	15
23. Total Number of Fish Collected:	1103

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI027 07/25/01

LOCKATONG CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	503	
White Sucker*	<i>Catostomus commersoni</i>	130	
Tessellated Darter	<i>Etheostoma olmsted</i>	95	
Common Shiner	<i>Luxilus cornutus</i>	65	
Creek Chub	<i>Semotilus atromaculatus</i>	60	
Banded Killifish	<i>Fundulus diaphanus</i>	56	
Satinfish Shiner	<i>Cyprinella analostana</i>	53	
Green Sunfish*	<i>Lepomis cyanellus</i>	53	1.9 - 4.5
Swallowtail Shiner	<i>Notropis procne</i>	48	
American Eel*	<i>Anguilla rostrata</i>	15	
Redbreast Sunfish*	<i>Lepomis aurtus</i>	12	2.2 - 4.3
Spottail Shiner	<i>Notropis hudsonius</i>	6	
Fathead Minnow	<i>Pimephales promelas</i>	4	
Brown Bullhead*	<i>Ameiurus nebulosus</i>	2	7.1 - 8.7
Largemouth Bass*	<i>Micropterus salmoides</i>	1	2.0

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI028



1. Stream Name:	Moore's Creek
2. Sampling Date:	07/23/2001
3. Sampling Location:	off Pleasant Valley Rd., bridge to house #48 (40 19 57N; 74 54 25W)
4. Municipality	Hopewell Twp.
5. County:	Mercer
6. Watershed Management Area:	11
7. Contributing Drainage Area (Sq. Mi.):	7.7
8. Stream Water Quality Class:	FW2-TM
9. FIBI Rating:	Good (42) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (132) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.93 mi. upstream of AN0101
AMNET Rating:	1992-Moderately Impaired; 1997-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	10.02
Temperature °C.	18.8
pH	8.31
Conductivity (µmhos/cm)	207
14. Number of Fish With Anomalies:	2
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	Partly Open
18. Discharge (ft. <sup>3</sup> /sec.):	6.0
19. Substrate: (qualitative)	10% Gravel/Sand, 20% Cobble, 70% Bedrock
20. Habitat Type: (qualitative)	20% Riffle, 65% Run, 15% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	18
23. Total Number of Fish Collected:	869

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI028 07/23/01

MOORES CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	187	
Creek Chub	<i>Semotilus atromaculatus</i>	170	
White Sucker*	<i>Catostomus commersoni</i>	155	
Tessellated Darter	<i>Etheostoma olmstedii</i>	110	
American Eel*	<i>Anguilla rostrata</i>	83	
Longnose Dace	<i>Rhinichthys cataractae</i>	51	
Green Sunfish*	<i>Lepomis cyanellus</i>	42	2.5 - 4.4
Rock Bass*	<i>Ambloplites rupestris</i>	22	2.8 - 6.3
Smallmouth Bass*	<i>Micropterus dolomieu</i>	14	3.7 - 9.6
Bluegill*	<i>Lepomis macrochirus</i>	10	2.2 - 3.9
Banded Killifish	<i>Fundulus diaphanus</i>	6	
Common Shiner	<i>Luxilus cornutus</i>	5	
Pumpkinseed*	<i>Lepomis gibbosus</i>	5	3.1 - 4.3
Largemouth Bass*	<i>Micropterus salmoides</i>	4	1.8 - 2.2
Redbreast Sunfish*	<i>Lepomis auritus</i>	2	4.5
Creek Chubsucker	<i>Erimyzon oblongus</i>	1	
Margined Madtom	<i>Noturus insignis</i>	1	
Yellow Bullhead*	<i>Ameiurus natalis</i>	1	7.1

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes



## SUMMARY OF RESULTS – FIBI029



1. Stream Name:	Alexauken Creek
2. Sampling Date:	07/12/2001
3. Sampling Location:	off Alexauken Ck Rd. (40 23 16N; 74 56 33W)
4. Municipality	W. Amwell Twp.
5. County:	Hunterdon
6. Watershed Management Area:	11
7. Contributing Drainage Area (Sq. Mi.):	14.3
8. Stream Water Quality Class:	FW2-TM
9. FIBI Rating:	Good (38) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (158) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.67 mi. upstream of AN0098
AMNET Rating:	1992-Non-Impaired; 1997-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9.1
Temperature °C.	19.9
pH	7.9
Conductivity (µmhos/cm)	250
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	35%, Mostly Open
18. Discharge (ft. <sup>3</sup> /sec.):	10.9
19. Substrate: (qualitative)	20% Gravel/Sand, 75% Cobble, 5% Boulder
20. Habitat Type: (qualitative)	30% Riffle, 45% Run, 25% Pool
21. Other observations:	Trash (tires, batteries, debris)
22. Number of Fish Species Identified: (see next page)	16
23. Total Number of Fish Collected:	582

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI029 07/12/01

ALEXAUKEN CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
White Sucker*	<i>Catostomus commersoni</i>	184	
Blacknose Dace	<i>Rhinichthys atratulus</i>	182	
American Eel*	<i>Anguilla rostrata</i>	137	
Redbreast Sunfish*	<i>Lepomis auritus</i>	15	1.8 - 5.5
Longnose Dace	<i>Rhinichthys cataractae</i>	13	
Rock Bass*	<i>Ambloplites rupestris</i>	11	2.4 - 6.3
Fallfish	<i>Semotilus corporalis</i>	11	
Tessellated Darter	<i>Etheostoma olmstedii</i>	8	
Margined Madtom	<i>Noturus insignis</i>	4	
Banded Killifish	<i>Fundulus diaphanus</i>	4	
Bluegill*	<i>Lepomis macrochirus</i>	4	1.8 - 3.3
Yellow Perch*	<i>Perca flavescens</i>	4	2.0 - 2.8
Smallmouth Bass*	<i>Micropterus dolomieu</i>	2	3.0 - 4.9
Swallowtail Shiner	<i>Notropis procne</i>	1	
Green Sunfish*	<i>Lepomis cyanellus</i>	1	2.7
Yellow Bullhead*	<i>Ameiurus natalis</i>	1	9.4

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI030



1. Stream Name:	Stony Brook
2. Sampling Date:	07/20/2001
3. Sampling Location:	off Stony Brook Rd. (40 22 19N; 74 47 22W)
4. Municipality	Hopewell Twp.
5. County:	Mercer
6. Watershed Management Area:	10
7. Contributing Drainage Area (Sq. Mi.):	17.3
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Good (40) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (148) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.24 mi. downstream of AN0391
AMNET Rating:	1994-Moderately Impaired; 1999-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9
Temperature °C.	20.4
pH	8.18
Conductivity (µmhos/cm)	195
14. Number of Fish With Anomalies:	4
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	Partly Open
18. Discharge (ft. <sup>3</sup> /sec.):	5.4
19. Substrate: (qualitative)	70% Cobble, 15% Boulder, 15% Silt
20. Habitat Type: (qualitative)	20% Riffle, 70% Run, 10% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	18
23. Total Number of Fish Collected:	901

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI030 07/20/01

STONY BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	168	
Common Shiner	<i>Luxilus cornutus</i>	105	
Redbreast Sunfish*	<i>Lepomis auritus</i>	81	1.4 - 7.3
White Sucker*	<i>Catostomus commersoni</i>	80	
Creek Chub	<i>Semotilus atromaculatus</i>	74	
American Eel*	<i>Anguilla rostrata</i>	74	
Tessellated Darter	<i>Etheostoma olmstedii</i>	74	
Bluegill*	<i>Lepomis macrochirus</i>	62	1.6 - 4.7
Pumpkinseed*	<i>Lepomis gibbosus</i>	54	1.6 - 5.5
Largemouth Bass*	<i>Micropterus salmoides</i>	35	1.2 - 6.7
Spottail Shiner	<i>Notropis hudsonius</i>	28	
Rock Bass*	<i>Ambloplites rupestris</i>	27	2.6 - 8.3
Comely Shiner	<i>Notropis amoenus</i>	21	
Redfin Pickerel*	<i>Esox americanus americanus</i>	5	3.5 - 8.7
Brown Bullhead*	<i>Ameiurus nebulosus</i>	5	3.9 - 10.6
Smallmouth Bass*	<i>Micropterus dolomieu</i>	3	4.3 - 13.4
Green Sunfish*	<i>Lepomis cyanellus</i>	3	3.0 - 4.6
Golden Shiner	<i>Notemigonus crysoleucas</i>	2	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI031



1. Stream Name:	North Branch Raritan River
2. Sampling Date:	08/01/2001
3. Sampling Location:	Easton Tpk. (40 36 00N; 74 40 24W)
4. Municipality	Bridgewater Twp.
5. County:	Somerset
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	172.7
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Good (42) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (160) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	2.47 mi. upstream of AN0374
AMNET Rating:	1990-Non-Impaired; 1999-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9.4
Temperature °C.	21.3
pH	7.9
Conductivity (µmhos/cm)	281
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	43%
18. Discharge (ft. <sup>3</sup> /sec.):	39.2
19. Substrate: (qualitative)	30% Gravel/Sand, 50% Cobble, 20% Silt
20. Habitat Type: (qualitative)	10% Riffle, 60% Run, 30% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	23
23. Total Number of Fish Collected:	813

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI031 08/01/01

NORTH BRANCH RARITAN RIVER

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	296	
Tessellated Darter	<i>Etheostoma olmstedii</i>	181	
White Sucker*	<i>Catostomus commersoni</i>	147	
Spottail Shiner	<i>Notropis hudsonius</i>	45	
American Eel*	<i>Anguilla rostrata</i>	39	
Redbreast Sunfish*	<i>Lepomis auritus</i>	33	2.4 - 7.1
Margined Madtom	<i>Noturus insignis</i>	15	
Shield Darter	<i>Percina peltata</i>	14	
Rock Bass*	<i>Ambloplites rupestris</i>	11	3.9 - 6.3
Smallmouth Bass*	<i>Micropterus dolomieu</i>	9	2.6 - 9.8
Green Sunfish*	<i>Lepomis cyanellus</i>	4	2.5 - 3.8
Yellow Bullhead*	<i>Ameiurus natalis</i>	3	8.3 - 9.8
Pumpkinseed*	<i>Lepomis gibbosus</i>	3	
Spotfin Shiner	<i>Cyprinella spiloptera</i>	3	
Common Shiner	<i>Luxilus cornutus</i>	2	
Comely Shiner	<i>Notropis amoenus</i>	1	
Blacknose Dace	<i>Rhinichthys atratulus</i>	1	
American Brook Lamprey	<i>Lampetra appendix</i>	1	
Yellow Perch*	<i>Perca flavescens</i>	1	2.2
Largemouth Bass*	<i>Micropterus salmoides</i>	1	3.9
Swallowtail Shiner	<i>Notropis procne</i>	1	
Carp*	<i>Cyprinus carpio</i>	1	
Banded Killifish	<i>Fundulus diaphanus</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI032



1. Stream Name:	Lamington River
2. Sampling Date:	07/03/2001
3. Sampling Location:	off Black River Rd. (40 40 24N; 74 43 20W)
4. Municipality	Bedminster Twp.
5. County:	Somerset
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	46.2
8. Stream Water Quality Class:	FW2-TM
9. FIBI Rating:	Good (44) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (161) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	1.14 mi. upstream of AN0363
AMNET Rating:	1994-Non-Impaired; 1999-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	10.2
Temperature °C.	16.4
pH	8.36
Conductivity (µmhos/cm)	252
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	Partly Open
18. Discharge (ft. <sup>3</sup> /sec.):	80.9
19. Substrate: (qualitative)	45% Gravel/Sand, 45% Cobble, 5% Boulder, 5% Silt
20. Habitat Type: (qualitative)	35% Riffle, 60% Run, 5% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	17
23. Total Number of Fish Collected:	292

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI032 07/03/01

LAMINGTON RIVER

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	75	
Blacknose Dace	<i>Rhinichthys atratulus</i>	49	
American Brook Lamprey	<i>Lampetra appendix</i>	31	
Margined Madtom	<i>Noturus insignis</i>	23	
Shield Darter	<i>Percina peltata</i>	19	
Tesselated Darter	<i>Etheostoma olmsted</i>	14	
American Eel*	<i>Anguilla rostrata</i>	13	
Redbreast Sunfish*	<i>Lepomis auritus</i>	11	2.8 - 6.1
Common Shiner	<i>Luxilus cornutus</i>	10	
Fallfish	<i>Semotilus corporalis</i>	9	
Satinfin Shiner	<i>Cyprinella analostana</i>	7	
Largemouth Bass*	<i>Micropterus salmoides</i>	6	1.4 - 1.8
Swallowtail Shiner	<i>Notropis procne</i>	6	
White Sucker*	<i>Catostomus commersoni</i>	6	
Brown Trout*	<i>Salmo trutta</i>	5	2.6 - 3.1
Creek Chub	<i>Semotilus atromaculatus</i>	5	
Banded Killifish	<i>Fundulus diaphanus</i>	3	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes





**The presence of young brown trout is an indicator of the good habitat and water quality in the Lamington River.**

## SUMMARY OF RESULTS – FIBI033



1. Stream Name:	Pohatcong Creek
2. Sampling Date:	07/31/2001
3. Sampling Location:	SR 31 (40 46 52N; 74 58 29W)
4. Municipality:	Washington Twp.
5. County:	Warren
6. Watershed Management Area:	1
7. Contributing Drainage Area (Sq. Mi.):	9.8
8. Stream Water Quality Class:	FW2-TM
9. FIBI Rating:	Good (44) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (145) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.94 mi. downstream of AN0055
AMNET Rating:	1992-Moderately Impaired; 1997-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9.2
Temperature °C.	19.8
pH	8
Conductivity (µmhos/cm)	231
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	28%
18. Discharge (ft. <sup>3</sup> /sec.):	23.7
19. Substrate: (qualitative)	5% Gravel/Sand, 60% Cobble, 30% Boulder, 5% Silt
20. Habitat Type: (qualitative)	35% Riffle, 15% Run, 50% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	22
23. Total Number of Fish Collected:	667

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI033 07/31/01

POHATCONG CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	138	
Common Shiner	<i>Luxilus cornutus</i>	133	
White Sucker*	<i>Catostomus commersoni</i>	112	
Cutlips Minnow	<i>Exoglossum maxillingua</i>	54	
Redbreast Sunfish*	<i>Lepomis auritus</i>	50	1.6 - 5.3
Satinfin Shiner	<i>Cyprinella analostana</i>	38	
Tesselated Darter	<i>Etheostoma olmsted</i>	33	
Longnose Dace	<i>Rhinichthys cataractae</i>	18	
Spottail Shiner	<i>Notropis hudsonius</i>	15	
Sea Lamprey	<i>Petromyzon marinus</i>	13	
Fallfish	<i>Semotilus corporalis</i>	12	
Brown Trout*	<i>Salmo trutta</i>	12	2.0 - 11.8
American Eel*	<i>Anguilla rostrata</i>	11	
Rock Bass*	<i>Ambloplites rupestris</i>	10	3.0 - 6.7
Margined Madtom	<i>Noturus insignis</i>	7	
Creek Chub	<i>Semotilus atromaculatus</i>	3	
Bluegill*	<i>Lepomis macrochirus</i>	3	3.3
Yellow Bullhead*	<i>Ameiurus natalis</i>	1	4.7
Pumpkinseed*	<i>Lepomis gibbosus</i>	1	3.3
Creek Chubsucker	<i>Erimyzon oblongus</i>	1	
Rainbow Trout*	<i>Oncorhynchus mykiss</i>	1	9.8
Brook Trout*	<i>Salvelinus fontinalis</i>	1	8.3

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI034



1. Stream Name:	Harihokake Creek
2. Sampling Date:	08/07/2001
3. Sampling Location:	Milford-Frenchtown Rd. (CR 619) (40 32 53N; 75 04 08W)
4. Municipality	Alexandria Twp.
5. County:	Hunterdon
6. Watershed Management Area:	11
7. Contributing Drainage Area (Sq. Mi.):	9.7
8. Stream Water Quality Class:	FW2-TM
9. FIBI Rating:	Good (40) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (163) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0079
AMNET Rating:	1992-Moderately Impaired; 1997-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.9
Temperature °C.	23.3
pH	8.3
Conductivity (µmhos/cm)	140
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	38%
18. Discharge (ft. <sup>3</sup> /sec.):	9.5
19. Substrate: (qualitative)	10% Gravel/Sand, 50% Cobble, 15% Boulder, 25% Bedrock
20. Habitat Type: (qualitative)	40% Riffle, 40% Run, 20% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	13
23. Total Number of Fish Collected:	310

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI034 08/07/01

HARIHOKAKE CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
White Sucker*	<i>Catostomus commersoni</i>	105	
Tessellated Darter	<i>Etheostoma olmsted</i>	47	
Blacknose Dace	<i>Rhinichthys atratulus</i>	45	
American Eel*	<i>Anguilla rostrata</i>	43	
Creek Chub	<i>Semotilus atromaculatus</i>	17	
Longnose Dace	<i>Rhinichthys cataractae</i>	17	
Redbreast Sunfish*	<i>Lepomis auritus</i>	12	3.7 - 5.5
Common Shiner	<i>Luxilus cornutus</i>	8	
Smallmouth Bass*	<i>Micropterus dolomieu</i>	5	2.8 - 11.0
Margined Madtom	<i>Noturus insignis</i>	4	
Green Sunfish*	<i>Lepomis cyanellus</i>	3	1.2
Rock Bass*	<i>Ambloplites rupestris</i>	3	3.1 - 6.3
Pumpkinseed*	<i>Lepomis gibbosus</i>	1	4.3

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI035



1. Stream Name:	Plum Brook
2. Sampling Date:	07/06/2001
3. Sampling Location:	Pine Hill Rd. (40 27 43N; 74 58 04W)
4. Municipality	Delaware Twp.
5. County:	Hunterdon
6. Watershed Management Area:	11
7. Contributing Drainage Area (Sq. Mi.):	5.5
8. Stream Water Quality Class:	FW2-TM
9. FIBI Rating:	Good (42) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (158) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0093
AMNET Rating:	1992-Non-Impaired; 1997-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.9
Temperature °C.	17.4
pH	8
Conductivity (µmhos/cm)	145
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	Mostly Closed
18. Discharge (ft. <sup>3</sup> /sec.):	5.3
19. Substrate: (qualitative)	5% Gravel/Sand, 80% Cobble, 15% Boulder
20. Habitat Type: (qualitative)	40% Riffle, 30% Run, 30% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	10
23. Total Number of Fish Collected:	284

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI035 07/06/01

PLUM BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	201	
Creek Chub	<i>Semotilus atromaculatus</i>	33	
White Sucker*	<i>Catostomus commersoni</i>	23	
American Eel*	<i>Anguilla rostrata</i>	11	
Common Shiner	<i>Luxilus cornutus</i>	5	
Green Sunfish*	<i>Lepomis cyanellus</i>	4	2.5 - 3.9
Largemouth Bass*	<i>Micropterus salmoides</i>	3	2.0 - 2.2
Bluegill*	<i>Lepomis macrochirus</i>	2	2.2 - 2.4
Golden Shiner	<i>Notemigonus crysoleucas</i>	1	
Tessellated Darter	<i>Etheostoma olmstedii</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI036



1. Stream Name:	Spruce Run
2. Sampling Date:	07/10/2001
3. Sampling Location:	Main St (40 41 29N; 74 56 14W)
4. Municipality	Glen Gardner Boro.
5. County:	Hunterdon
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	12.4
8. Stream Water Quality Class:	FW2-TP(C1)
9. FIBI Rating:	Excellent (46) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (140) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.42 mi. upstream of AN0319
AMNET Rating:	1994-Non-Impaired; 1999-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9.8
Temperature °C.	18.2
pH	7.75
Conductivity (µmhos/cm)	195
14. Number of Fish With Anomalies:	1
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	38%
18. Discharge (ft. <sup>3</sup> /sec.):	20.1
19. Substrate: (qualitative)	30% Gravel/Sand, 60% Cobble, 10% Boulder
20. Habitat Type: (qualitative)	60% Riffle, 20% Run, 20% Pool
21. Other observations:	Retaining wall first 75 feet
22. Number of Fish Species Identified: (see next page)	11
23. Total Number of Fish Collected:	257

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.



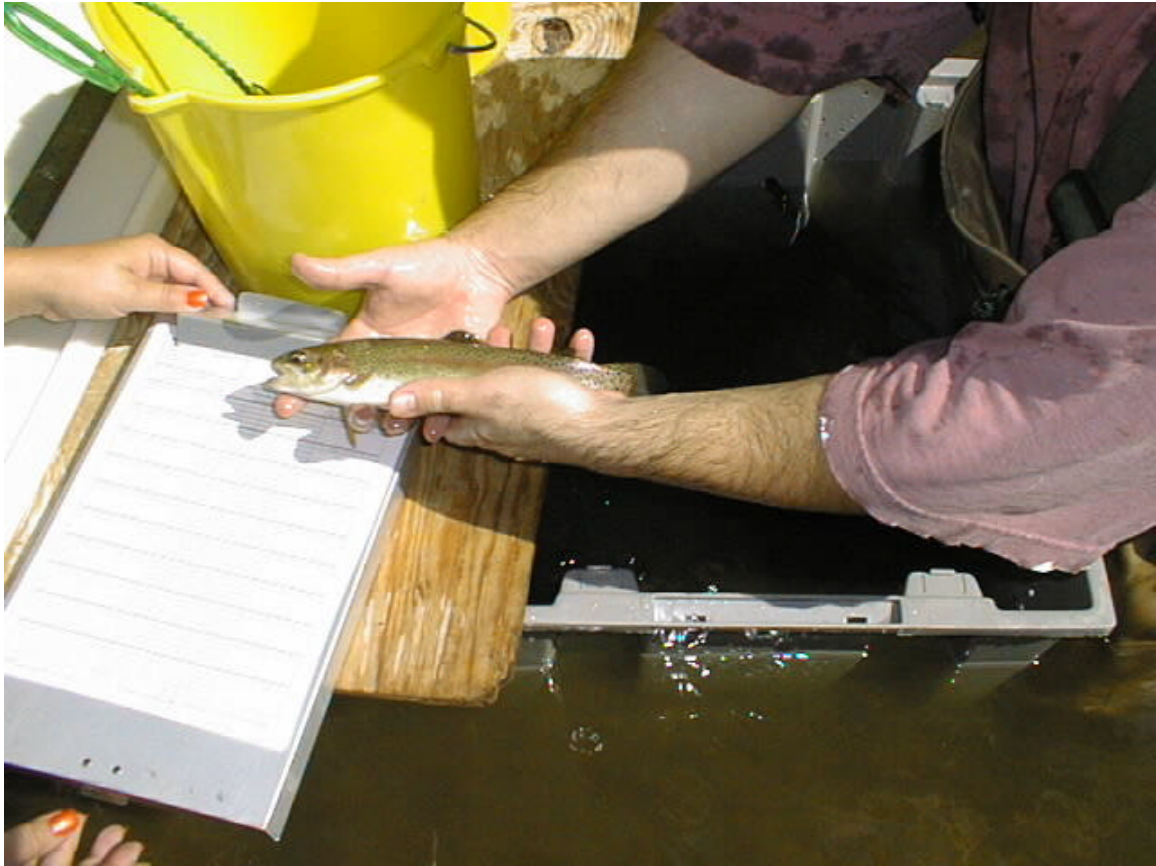
**FIBI036** 07/10/01

SPRUCE RUN

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	93	
Longnose Dace	<i>Rhinichthys cataractae</i>	71	
White Sucker*	<i>Catostomus commersoni</i>	42	
American Eel*	<i>Anguilla rostrata</i>	15	
Brown Trout*	<i>Salmo trutta</i>	12	2.4 - 16.5
Creek Chub	<i>Semotilus atromaculatus</i>	7	
Smallmouth Bass*	<i>Micropterus dolomieu</i>	6	6.3 - 8.1
Rainbow Trout*	<i>Oncorhynchus mykiss</i>	5	9.8 - 10.6
Tessellated Darter	<i>Etheostoma olmsted</i>	3	
Brook Trout*	<i>Salvelinus fontinalis</i>	2	6.5 - 10.6
Pumpkinseed*	<i>Lepomis gibbosus</i>	1	3.1

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes



**Despite its urbanized setting, Spruce Run continues to provide habitat suitable for the reproduction and maintenance of several species of trout. A rainbow trout is shown here.**

## SUMMARY OF RESULTS – FIBI037



1. Stream Name:	Drakes Brook
2. Sampling Date:	08/09/2001
3. Sampling Location:	Old R .R. off N. Four Bridges Rd. (40 48 42N; 74 43 57W)
4. Municipality	Washington Twp.
5. County:	Morris
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	17.0
8. Stream Water Quality Class:	FW2-NT(C1)
9. FIBI Rating:	Good (44) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (178) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	0.19 mi. downstream of AN0312
AMNET Rating:	1994-Non-Impaired; 1999-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	8.7
Temperature °C.	21.4
pH	7.9
Conductivity (µmhos/cm)	354
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	8%
18. Discharge (ft. <sup>3</sup> /sec.):	3.9
19. Substrate: (qualitative)	10% Gravel/Sand, 80% Cobble, 10% Silt
20. Habitat Type: (qualitative)	25% Riffle, 50% Run, 25% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	18
23. Total Number of Fish Collected:	544

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI037 08/09/01

DRAKES BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Brook Trout*	<i>Salvelinus fontinalis</i>	132	2.0 - 11.4
Slimy Sculpin	<i>Cottus cognatus</i>	123	
White Sucker*	<i>Catostomus commersoni</i>	75	
Tessellated Darter	<i>Etheostoma olmstedii</i>	58	
Blacknose Dace	<i>Rhinichthys atratulus</i>	51	
Brown Trout*	<i>Salmo trutta</i>	27	2.6 - 15.7
Longnose Dace	<i>Rhinichthys cataractae</i>	21	
Fallfish	<i>Semotilus corporalis</i>	18	
Eastern Mudminnow	<i>Umbra pygmaea</i>	12	
Green Sunfish*	<i>Lepomis cyanellus</i>	7	2.2 - 4.8
Bluegill*	<i>Lepomis macrochirus</i>	7	3.1 - 5.1
Pumpkinseed*	<i>Lepomis gibbosus</i>	4	2.4 - 4.3
Redfin Pickerel*	<i>Esox americanus americanus</i>	4	3.1 - 6.9
Common Shiner	<i>Luxilus cornutus</i>	1	
Redbreast Sunfish*	<i>Lepomis auritus</i>	1	2.8
Yellow Perch*	<i>Perca flavescens</i>	1	5.1
Margined Madtom	<i>Noturus insignis</i>	1	
Golden Shiner	<i>Notemigonus crysoleucas</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI038



1. Stream Name:	Middle Brook
2. Sampling Date:	08/06/2001
3. Sampling Location:	River Rd. (40 38 51N; 74 40 52W)
4. Municipality	Bedminster Twp.
5. County:	Somerset
6. Watershed Management Area:	8
7. Contributing Drainage Area (Sq. Mi.):	6.5
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Good (38) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (155) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0355
AMNET Rating:	1994-Moderately Impaired; 1999-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	7.61
Temperature °C.	23.1
pH	7.75
Conductivity (µmhos/cm)	245
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Turbid
17. Average Forest Open Canopy:	10%
18. Discharge (ft. <sup>3</sup> /sec.):	3.0
19. Substrate: (qualitative)	20% Gravel/Sand, 40% Cobble, 40% Silt
20. Habitat Type: (qualitative)	25% Riffle, 25% Run, 50% Pool
21. Other observations:	extreme lack of fish
22. Number of Fish Species Identified: (see next page)	18
23. Total Number of Fish Collected:	129

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI038 08/06/01

MIDDLE BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	24	
Green Sunfish*	<i>Lepomis cyanellus</i>	13	2.3 - 4.6
Longnose Dace	<i>Rhinichthys cataractae</i>	13	
White Sucker*	<i>Catostomus commersoni</i>	12	
Bluegill*	<i>Lepomis macrochirus</i>	11	1.2 - 3.5
Redbreast Sunfish*	<i>Lepomis auritus</i>	10	4.3 - 4.7
Banded Killifish	<i>Fundulus diaphanus</i>	7	
Rock Bass*	<i>Ambloplites rupestris</i>	7	2.4 - 6.3
Blacknose Dace	<i>Rhinichthys atratulus</i>	6	
American Eel*	<i>Anguilla rostrata</i>	6	
Pumpkinseed*	<i>Lepomis gibbosus</i>	5	3.1 - 3.5
Largemouth Bass*	<i>Micropterus salmoides</i>	4	1.6 - 3.5
Redfin Pickerel*	<i>Esox americanus americanus</i>	3	3.1 - 6.7
Golden Shiner	<i>Notemigonus crysoleucas</i>	2	
Yellow Perch*	<i>Perca flavescens</i>	2	2.0
Brown Bullhead*	<i>Ameiurus nebulosus</i>	2	4.7 - 5.9
Creek Chub	<i>Semotilus atromaculatus</i>	1	
Swallowtail Shiner	<i>Notropis procne</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

## SUMMARY OF RESULTS – FIBI039



1. Stream Name:	Van Campens Brook
2. Sampling Date:	08/15/2001
3. Sampling Location:	Depew Rec Site Rd. off Old Mine Rd. (41 03 28N; 75 00 12W)
4. Municipality	Hardwick Twp.
5. County:	Warren
6. Watershed Management Area:	1
7. Contributing Drainage Area (Sq. Mi.):	7.6
8. Stream Water Quality Class:	FW2-TP(C1)
9. FIBI Rating:	Excellent (50) (See Appendix 3)
10. Habitat Assessment Rating:	Optimal (186) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0011
AMNET Rating:	1992-Non-Impaired; 1997-Non-Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9.43
Temperature °C.	18.6
pH	8.54
Conductivity (µmhos/cm)	89
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	9%
18. Discharge (ft. <sup>3</sup> /sec.):	13.3
19. Substrate: (qualitative)	10% Gravel/Sand, 80% Cobble, 10% Boulder
20. Habitat Type: (qualitative)	60% Riffle, 30% Run, 10% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	13
23. Total Number of Fish Collected:	414

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI039 08/15/01

VAN CAMPENS BROOK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	262	
Brown Trout*	<i>Salmo trutta</i>	56	2.6 - 14.2
American Eel*	<i>Anguilla rostrata</i>	40	
Creek Chub	<i>Semotilus atromaculatus</i>	22	
Longnose Dace	<i>Rhinichthys cataractae</i>	9	
Fallfish	<i>Semotilus corporalis</i>	8	
Brook Trout*	<i>Salvelinus fontinalis</i>	5	2.8 - 9.8
Cutlips Minnow	<i>Exoglossum maxillingua</i>	4	
Pumpkinseed*	<i>Lepomis gibbosus</i>	3	3.5 - 3.9
White Sucker*	<i>Catostomus commersoni</i>	2	
Yellow Perch*	<i>Perca flavescens</i>	1	2.0
Margined Madtom	<i>Noturus insignis</i>	1	
Tessellated Darter	<i>Etheostoma olmstedii</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes





**Several dozen brown trout were found in this section of Van Campens Brook, attesting to the excellent habitat provided by this protected waterway.**

## SUMMARY OF RESULTS – FIBI040



1. Stream Name:	West Branch Papakating Creek
2. Sampling Date:	08/21/2001
3. Sampling Location:	CR 565 (41 11 51N; 74 37 52W)
4. Municipality:	Wantage Twp.
5. County:	Sussex
6. Watershed Management Area:	2
7. Contributing Drainage Area (Sq. Mi.):	11.3
8. Stream Water Quality Class:	FW2-NT
9. FIBI Rating:	Excellent (46) (See Appendix 3)
10. Habitat Assessment Rating:	Suboptimal (125) (See Appendix 3)
11. Fishable Species Present:	Yes
12. Relevant AMNET <sup>1</sup> Station Data:	
Proximity of FIBI station to AMNET station:	AN0306
AMNET Rating:	1990-Non-Impaired; 1998-Moderately Impaired
13. Stream Chemistries:	
Dissolved Oxygen (mg/l)	9.6
Temperature °C.	21.4
pH	7.67
Conductivity (µmhos/cm)	349
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 meters (492 feet)
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	25%
18. Discharge (ft. <sup>3</sup> /sec.):	1.5
19. Substrate: (qualitative)	10% Gravel/Sand, 80% Cobble, 10% Boulder
20. Habitat Type: (qualitative)	60% Riffle, 30% Run, 10% Pool
21. Other observations:	N/A
22. Number of Fish Species Identified: (see next page)	15
23. Total Number of Fish Collected:	851

<sup>1</sup> AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI040 08/21/01

WEST BRANCH PAPA KATING CREEK

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	256	
White Sucker*	<i>Catostomus commersoni</i>	149	
Creek Chub	<i>Semotilus atromaculatus</i>	129	
Blacknose Dace	<i>Rhinichthys atratulus</i>	103	
Pumpkinseed*	<i>Lepomis gibbosus</i>	69	2.0 - 3.1
Common Shiner	<i>Luxilus cornutus</i>	62	
Tessellated Darter	<i>Etheostoma olmstedii</i>	42	
Redfin Pickerel*	<i>Esox americanus americanus</i>	19	3.1 - 7.1
Bluegill*	<i>Lepomis macrochirus</i>	8	2.6 - 2.8
Golden Shiner	<i>Notemigonus crysoleucas</i>	4	
Brook Trout*	<i>Salvelinus fontinalis</i>	3	11.8 - 12.8
Redbreast Sunfish*	<i>Lepomis auritus</i>	2	3.7 - 4.3
Largemouth Bass*	<i>Micropterus salmoides</i>	2	3.7 - 4.3
Cutlips Minnow	<i>Exoglossum maxillingua</i>	2	
Banded Killifish	<i>Fundulus diaphanus</i>	1	

\* Regulated as a fishable species under current New Jersey Fish and Wildlife codes

# APPENDIX 1

## Revised List of New Jersey Freshwater Fishes

December 2000

	Trophic Guild	Tolerance	Historical Presence
Petromyzontidae:			
American Brook Lamprey ( <i>Lampetra appendix</i> )	NF	IS	N
Sea Lamprey ( <i>Petromyzon marinus</i> )	PF	--	N
Acipenseridae:			
Atlantic Sturgeon ( <i>Acipenser oxyrhynchus</i> )	BI	--	N
Shortnose Sturgeon ( <i>A. brevirostrum</i> )	BI	IS	N
Lepisosteidae:			
Longnose Gar ( <i>Lepisosteus osseus</i> )	P	--	EX
Amiidae:			
Bowfin ( <i>Amia calva</i> )	P	--	NN
Anguillidae:			
American Eel ( <i>Anguilla rostrata</i> )	P	--	N
Clupeidae:			
Blueback Herring ( <i>Alosa aestivalis</i> )	PL	--	N
Hickory Shad ( <i>A. mediocris</i> )	I/P	--	N
Alewife ( <i>A. pseudoharengus</i> )	PL	--	N
American Shad ( <i>A. sapidissima</i> )	PL	--	N
Gizzard Shad ( <i>Dorosoma cepedianum</i> )	O	--	N
Salmonidae:			
Rainbow Trout ( <i>Oncorhynchus mykiss</i> )	I/P	IS	NN
Brown Trout ( <i>Salmo trutta</i> )	I/P	IS	E
Brook Trout ( <i>Salvelinus fontinalis</i> )	I/P	IS	N
Lake Trout ( <i>S. namaycush</i> )	P	--	NN
Osmeridae:			
Rainbow Smelt ( <i>Osmerus mordax</i> )	I	--	N
Umbridae:			
Eastern Mudminnow ( <i>Umbra pygmaea</i> )	I	--	N
Esocidae:			
Redfin Pickerel ( <i>Esox americanus</i> )	P	--	N
Northern Pike ( <i>E. lucius</i> )	P	--	NN
Muskellunge ( <i>E. masquinongy</i> )	P	--	NN
Chain Pickerel ( <i>E. niger</i> )	P	--	N
Cyprinidae:			
Goldfish ( <i>Carassius auratus</i> )	O	--	E
Grass Carp ( <i>Ctenopharyngodon idella</i> )	H	--	E
Satinfin Shiner ( <i>Cyprinella analostana</i> )	I	--	N
Spotfin Shiner ( <i>C. spiloptera</i> )	I	--	N
Common Carp ( <i>Cyprinus carpio</i> )	O	--	E
Cutlips Minnow ( <i>Exoglossum maxillingua</i> )	BI	IS	N
Eastern Silvery Minnow ( <i>Hybognathus regius</i> )	H	--	N
Common Shiner ( <i>Luxilis cornutus</i> )	I	--	N
Golden Shiner ( <i>Notemigonus crysoleucas</i> )	O	--	N
Comely Shiner ( <i>Notropis amoenus</i> )	I	--	N

# APPENDIX 1

	Trophic Guild	Tolerance	Historical Presence
Bridle Shiner ( <i>N. bifrenatus</i> )	I	--	N
Ironcolor Shiner ( <i>N. chalybaeus</i> )	I	--	N
Spottail Shiner ( <i>N. husdonius</i> )	I	--	N
Swallowtail Shiner ( <i>N. procne</i> )	I	--	N
Bluntnose Minnow ( <i>Pimephales notatus</i> )	O	--	NN
Fathead Minnow ( <i>P. promelas</i> )	O	--	NN
Blacknose Dace ( <i>Rhinichthys atratulus</i> )	BI	--	N
Longnose Dace ( <i>R. cataractae</i> )	BI	--	N
Creek Chub ( <i>Semotilus atromaculatus</i> )	I	--	N
Fallfish ( <i>S. corporalis</i> )	I	--	N
Catostomidae:			
White Sucker ( <i>Catostomus commersoni</i> )	BI	--	N
Creek Chubsucker ( <i>Erimyzon oblongus</i> )	BI	--	N
Northern Hog Sucker ( <i>Hypentelium nigricans</i> )	BI	IS	N
Ictaluridae:			
White Catfish ( <i>Ameiurus catus</i> )	I/P	--	N
Black Bullhead ( <i>A. melas</i> )	BI	--	NN
Yellow Bullhead ( <i>A. natalis</i> )	BI	--	N
Brown Bullhead ( <i>A. nebulosus</i> )	BI	--	N
Channel Catfish ( <i>Ictalurus punctatus</i> )	I/P	--	NN
Tadpole Madtom ( <i>Noturus gyrinus</i> )	BI	--	N
Margined Madtom ( <i>N. insignis</i> )	BI	IS	N
Aphredoderidae:			
Pirate Perch ( <i>Aphredoderus sayanus</i> )	I	--	N
Cyprinodontidae:			
Banded Killifish ( <i>Fundulus diaphanus</i> )	I	--	N
Mummichog ( <i>F. heteroclitus</i> )	I	--	N
Poeciliidae:			
Mosquitofish ( <i>Gambusia affinis</i> )	I	--	NN
Eastern Mosquitofish ( <i>G. holbrooki</i> )	I	--	N
Gasterosteidae:			
Fourspine Stickleback ( <i>Apeltes quadracus</i> )	I	--	N
Threespine Stickleback ( <i>Gasterosteus aculeatus</i> )	I	--	N
Ninespine Stickleback ( <i>Pungitius pungitius</i> )	I	--	N
Moronidae:			
White Perch ( <i>Morone americana</i> )	I/P	--	N
Striped Bass ( <i>M. saxatilis</i> )	P	--	N
Centrarchidae:			
Mud Sunfish ( <i>Acantharchus pomotis</i> )	I	--	N
Rock Bass ( <i>Ambloplites rupestris</i> )	I	--	NN
Blackbanded Sunfish ( <i>Enneacanthus chaetodon</i> )	I	--	N
Bluespotted Sunfish ( <i>E. gloriosus</i> )	I	--	N
Banded Sunfish ( <i>E. obesus</i> )	I	--	N
Redbreasted Sunfish ( <i>Lepomis auritus</i> )	I	--	N
Green Sunfish ( <i>L. cyanellus</i> )	I	--	NN

# APPENDIX 1

	Trophic Guild	Tolerance	Historical Presence
Pumpkinseed ( <i>L. gibbosus</i> )	I	--	N
Bluegill ( <i>L. macrochirus</i> )	I	--	NN
Smallmouth Bass ( <i>Micropterus dolomieu</i> )	I/P	--	NN
Largemouth Bass ( <i>M. salmoides</i> )	P	--	NN
White Crappie ( <i>Pomoxis annularis</i> )	I/P	--	NN
Black Crappie ( <i>P. nigromaculatus</i> )	I/P	--	NN
Percidae:			
Swamp Darter ( <i>Etheostoma fusiforme</i> )	BI	IS	N
Tessellated Darter ( <i>E. olmstedii</i> )	BI	--	N
Yellow Perch ( <i>Perca flavescens</i> )	I/P	--	N
Shield Darter ( <i>Percina peltata</i> )	BI	IS	N
Walleye ( <i>Stizostedion vitreum</i> )	P	IS	NN
Cottidae:			
Slimy Sculpin ( <i>Cottus cognatus</i> )	BI	IS	N

## Abbreviations:

BI	Benthic Insectivore or Invertivore	IS	Intolerant Species
E	Exotic	N	Native
EX	Extirpated (no longer found in NJ)	O	Omnivore
NF	Nonparasitic filterer	P	Piscivore (top carnivore)
PF	Parasitic / Filterer	PL	Planktivore
H	Herbivore	NN	Non Native (introduced)
I	Insectivore		

## APPENDIX 2

### IBI For Northern New Jersey

(Metrics and Scoring Criteria)  
as of 05/03/2000

	SCORING CRITERIA		
	5	3	1
SPECIES RICHNESS AND COMPOSITION:			
1) Total Number of Fish Species	VARIES WITH STREAM SIZE		
2) Number and Identity of benthic insectivorous species	VARIES WITH STREAM SIZE		
3) Number and identity of trout and/or sunfish species	VARIES WITH STREAM SIZE		
4) Number and identity of intolerant species	VARIES WITH STREAM SIZE		
5) Proportion of individuals as white suckers	<10%	10-30%	>30%
TROPHIC COMPOSITION:			
6) Proportion of individuals as generalists (carp, creek chub, goldfish, fathead minnow, green sunfish, banded killifish)	<20%	20-45%	>45%
7) Proportion of individuals as insectivorous cyprinids	>45%	20-45%	<20%
8) Proportion of individuals as trout	>10%	3-10%	<3%
<b>OR</b> (whichever gives better score)			
Proportion of individuals as piscivores (excluding American eel)	>5%	1-5%	<1%
FISH ABUNDANCE AND CONDITION:			
9) Number of individuals in the sample	>250	75-250	<75
10) Proportion of individuals with disease and anomalies (excluding blackspot disease)	<2%	2-5%	>5%

Condition Categories (modified from Karr et al. 1986)

<b>45-50 Excellent</b>	Comparable to the best situations with minimal human disturbance: all regionally expected species for the habitat and stream size, most intolerant forms are present and there is a balanced trophic structure.
<b>37-44 Good</b>	Species richness somewhat below expectation, especially due to the loss of some intolerant species; some species present with less than optimal abundances or size distributions; trophic structure shows some signs of stress (increasing frequency of generalists, white suckers and other tolerant species).
<b>29-36 Fair</b>	Signs of additional deterioration include fewer species, loss of most intolerant species, highly skewed trophic structure (high frequency of generalists, whites suckers and other tolerant species); older age classes of trout and/or top carnivores may be rare.
<b>10-28 Poor</b>	Low species richness, dominated by generalists, white suckers or other tolerant species, few (if any) trout or top carnivores, individuals may show signs of disease/parasites and site may have overall low abundance of fish.

## APPENDIX 2

### Species to be included in each of the metrics used by the NJDEP:

**Benthic Insectivores (Metric 2)** – Sturgeon, Cutlips Minnow, Dace, Suckers, Bullheads, Madtoms, Darters and Sculpins

**Trout\* and Sunfish (Metric 3, 8)** – All species in the families Salmonidae and Centrarchidae

**Intolerant Species (Metric 4)** – American Brook Lamprey, Shortnose Sturgeon, All Trout species, Cutlips Minnow, Northern Hog Sucker, Margined Madtom, Swamp Darter, Shield Darter, Walleye and Slimy Sculpin

**Insectivorous Cyprinids (Metric 7)** – All minnows (Family Cyprinidae) in the following genera: *Cyprinella*, *Exoglossum*, *Luxilus*, *Notropis*, *Rhinichthys* and *Semotilus*

**Piscivores (Metric 8)<sup>†</sup>**

\* Streams that have been stocked with trout are sampled during July and August. Both stocked and resident trout found during these months are counted in the IBI scoring. The ability of a stream to support trout during these harsh months (high temperature, low dissolved oxygen) is indicative of good water quality and habitat.

<sup>†</sup>The current form of the New Jersey IBI (Kurtenbach 1994) requires the classification of fish species into trophic categories prior to scoring metric #8. However, many fish species fall into multiple categories as a function of size and life stage. Consequently, the bureau has used available literature (Turner and Kraatz, 1921; Keast and Webb, 1966; Goldstein, 1993), stomach content analysis (Bremer-Faust, 2001; Margolis, unpublished data) and best professional judgement to designate trophic guilds for these species for the 2001 IBI. These designations, which only affect Metric #8, are as follows:

Green Sunfish	Insectivorous
Rock Bass	Insectivorous
Smallmouth Bass	> 90 mm - Piscivorous
Largemouth Bass	> 90 mm - Piscivorous
Yellow Perch	>150 mm - Piscivorous

### Literature Cited

- Bremer-Faust, C.M. 2001. *Piscivory in green sunfish (Lepomis cyanellus): A comparison of methods of analysis*. George H. Cook Honors Thesis, Cook College, Rutgers University. 49 pp.
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## **APPENDIX 3**

### **IBI AND HABITAT SCORING SHEETS/GRAPHS**

**FIBI008-Sidney Brook @ Sidney Rd**  
**Date Sampled - 8/23/2001**

**Excellent** Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

**Stream Rating**

**45-50      Excellent**  
**37-44      Good**  
**29-36      Fair**  
**10-28      Poor**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 8 (LB)	Left Bank	10	9				7	6			5	4	3			2	1	0			
SCORE 8 (RB)	Right Bank	10	9				7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 8 (LB)	Left Bank	10	9				7	6			5	4	3			2	1	0			
SCORE 8 (RB)	Right Bank	10	9				7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 9 (LB)	Left Bank	10				8	7	6			5	4	3			2	1	0			
SCORE 9 (RB)	Right Bank	10				8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

164

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI011a-Meadow Brook @ dwnstr of Belmont Ave**  
**Date Sampled - 8/28/2001**

Excellent

**Good**

Fair

Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	1
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS*

**Meadow Brook (FIBI011a) – 8/28/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __1__ (LB)	Left Bank	10	9			8	7	6			5	4	3			2				0	
SCORE __1__ (RB)	Right Bank	10	9			8	7	6			5	4	3			2				0	
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __7__ (LB)	Left Bank	10	9			8		6			5	4	3			2	1			0	
SCORE __7__ (RB)	Right Bank	10	9			8		6			5	4	3			2	1			0	
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __2__ (LB)	Left Bank	10	9			8	7	6			5	4	3					1		0	
SCORE __2__ (RB)	Right Bank	10	9			8	7	6			5	4	3					1		0	

## HABITAT SCORE

**130**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI021 - Rockaway River @ Knoll Rd**  
**Date Sampled - 6/07/2001**

Excellent    Good

**Fair**    Poor

	Score
# of Fish Species	3
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout                      *whichever gives better score	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	<b>34</b>

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS*

**Rockaway River (FIBI021) – 6/7/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __10__ (LB)	Left Bank	10		9		8	7	6			5	4	3			2	1	0			
SCORE __10__ (RB)	Right Bank	10		9		8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __9__ (LB)	Left Bank	10		8		8	7	6			5	4	3			2	1	0			
SCORE __10__ (RB)	Right Bank	10		9		8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __4__ (LB)	Left Bank	10		9		8	7	6			5		3			2	1	0			
SCORE __8__ (RB)	Right Bank	10		9			7	6			5	4	3			2	1	0			

## HABITAT SCORE

**163**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI023 - Neshanic River @ Kuhl Rd**  
**Date Sampled - 8/03/2001**

Excellent    Good

**Fair**    Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	1
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	3
Proportion of Individuals as Trout                      *whichever gives better score	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	<b>36</b>

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>



# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS*

**Neshanic River (FIBI023) – 8/3/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank)  Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>6</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>6</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>2</u> (LB)	Left Bank	10	9			8	7	6			5	4	3				1	0			
SCORE <u>2</u> (RB)	Right Bank	10	9			8	7	6			5	4	3				1	0			

## HABITAT SCORE

**130**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI024 - Passaic River @ Stonehouse & Haas Rd**  
**Date Sampled - 8/08/2001**

Excellent    Good

**Fair**    Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	1
Proportion of Individuals as Trout                      *whichever gives better score	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	<b>36</b>

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank)  Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 9 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 5 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 11 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 7 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 11 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 7 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0

## HABITAT SCORE

108

## HABITAT SCORES

## VALUE

OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI025 - Peters Bk @ Park Ave**

Excellent    Good

**Fair**

Poor

**Date Sampled - 6/14/2001**

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	3
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	3
Proportion of Individuals as Trout                      *whichever gives better score	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	<b>34</b>

**Stream Rating**

**45-50      Excellent**

**37-44      Good**

**29-36      Fair**

**10-28      Poor**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 4 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 4 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 4 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 4 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 3 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 3 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

109

## HABITAT SCORES

## VALUE

OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

FIBI026 - Nishisakawick Ck @ Creek Rd.

Excellent

**Good**

Fair

Poor

Date Sampled - 7/24/2001

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	44

**Stream Rating**

**45-50      Excellent**

**37-44      Good**

**29-36      Fair**

**10-28      Poor**

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Nishisakawick Creek (FIBI026) - 7/24/01

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 8 (LB)	Left Bank	10	9				7	6			5	4	3			2	1	0			
SCORE 9 (RB)	Right Bank	10				8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 8 (LB)	Left Bank	10	9				7	6			5	4	3			2	1	0			
SCORE 9 (RB)	Right Bank	10				8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 7 (LB)	Left Bank	10	9			8		6			5	4	3			2	1	0			
SCORE 9 (RB)	Right Bank	10				8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

167

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI027 - Lockatong Ck @ Rt. 519**

**Date Sampled - 7/25/2001**

Excellent

**Good**

Fair

Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	38

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>



# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Lockatong Creek (FIBI027) – 7/25/01

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE ____ (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE ____ (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE ____ (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE ____ (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE ____ (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE ____ (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

**134**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI028 - Moores Creek off Pleasant Valley Rd**  
**Date Sampled - 7/23/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	3
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

**Stream Rating**

**45-50      Excellent**  
**37-44      Good**  
**29-36      Fair**  
**10-28      Poor**

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Moore's Creek (FIBI028) – 7/23/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __4__ (LB)	Left Bank	10	9			8	7	6			5			3		2	1	0			
SCORE __4__ (RB)	Right Bank	10	9			8	7	6			5			3		2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __7__ (LB)	Left Bank	10	9			8			6		5	4	3			2	1	0			
SCORE __7__ (RB)	Right Bank	10	9			8			6		5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __3__ (LB)	Left Bank	10	9			8	7	6			5	4				2	1	0			
SCORE __6__ (RB)	Right Bank	10	9			8	7				5	4	3			2	1	0			

## HABITAT SCORE

**132**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI029 - Alexauken Ck off Alexauken Creek Rd**  
**Date Sampled - 7/12/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	1
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	3
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	38

**Stream Rating**

**45-50      Excellent**  
**37-44      Good**  
**29-36      Fair**  
**10-28      Poor**

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Alexauken Creek (FIBI029) – 7/12/01

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 7 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 9 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 8 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 10 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 8 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 10 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

158

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI030 - Stony Bk off Stony Brook Rd**  
**Date Sampled - 7/20/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	3
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	40

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Stony Brook (FIBI030) – 7/20/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __6__ (LB)	Left Bank	10	9			8	7	6	5	4	3	2	1	0		2	1	0			
SCORE __6__ (RB)	Right Bank	10	9			8	7	6	5	4	3	2	1	0		2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __10__ (LB)	Left Bank	10	9			8	7	6	5	4	3	2	1	0		2	1	0			
SCORE __10__ (RB)	Right Bank	10	9			8	7	6	5	4	3	2	1	0		2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __4__ (LB)	Left Bank	10	9			8	7	6	5	4	3	2	1	0		2	1	0			
SCORE __10__ (RB)	Right Bank	10	9			8	7	6	5	4	3	2	1	0		2	1	0			

## HABITAT SCORE

**148**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

FIBI031 - N. Branch Raritan River @ CR 614

Excellent

**Good**

Fair

Poor

Date Sampled - 8/01/2001

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	3
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

**Stream Rating**

**45-50      Excellent**

**37-44      Good**

**29-36      Fair**

**10-28      Poor**



# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **North Branch Raritan River (FIBI031) – 8/1/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 5 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 5 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 10 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 10 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 8 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 10 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

160

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI032 - Lamington River @ Black River Rd**  
**Date Sampled - 7/03/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	44

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Lamington River (FIBI032) – 7/3/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>6</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>8</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>6</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

161

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI033 - Pohatcong Creek @ Rt. 31**  
**Date Sampled - 7/31/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	44

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Pohatcong Creek (FIBI033) – 7/31/01

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 6 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 7 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 3 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 9 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 0 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 10 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

**145**

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

FIBI034 - Harihokake Creek @ CR 619

Excellent

**Good**

Fair

Poor

Date Sampled - 8/07/2001

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	1
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	3
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	40

**Stream Rating**

**45-50      Excellent**

**37-44      Good**

**29-36      Fair**

**10-28      Poor**

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Harihokake Creek (FIBI034) – 8/7/01

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 7 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 9 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 10 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 10 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 9 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 6 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0

## HABITAT SCORE

163

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI035 - Plum Brook @ Pine Hill Rd**  
**Date Sampled - 7/06/01**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>



# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Plum Brook (FIBI035) – 7/6/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 9 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 8 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 10 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 10 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 10 (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0
SCORE 5 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	0	0	0	2	1	0	0	0	0

## HABITAT SCORE

158

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI036 - Spruce Run @ Main St**  
**Date Sampled - 7/10/2001**

**Excellent** Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

**Stream Rating**

**45-50      Excellent**  
**37-44      Good**  
**29-36      Fair**  
**10-28      Poor**

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Spruce Run (FIBI036) – 7/10/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 6 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 3 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 6 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 5 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 5 (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE 2 (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

140

HABITAT SCORES	VALUE
OPTIMAL	160 X 200
<b>SUB-OPTIMAL</b>	<b>110 X 159</b>
MARGINAL	60 X 109
POOR	< 60

**FIBI037-Drakes Bk b/w Bartley & N 4 Bridges Rd**  
**Date Sampled - 8/09/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	1
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	5
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	44

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Drakes Brook (FIBI037) – 8/9/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __9__ (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0									
SCORE __9__ (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0									
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __10__ (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0									
SCORE __10__ (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0									
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __10__ (LB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0									
SCORE __10__ (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0									

## HABITAT SCORE

178

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI038 - Middle Brook @ River Rd**  
**Date Sampled - 8/06/2001**

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	1
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	38

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Middle Brook (FIBI038) – 8/6/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and not transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __5__ (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE __5__ (RB)	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __9__ (LB)	Left Bank	10	9	8		8	7	6			5	4	3			2	1	0			
SCORE __9__ (RB)	Right Bank	10	9	8		8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __10__ (LB)	Left Bank	10	9	8		8	7	6			5	4	3			2	1	0			
SCORE __10__ (RB)	Right Bank	10	9	8		8	7	6			5	4	3			2	1	0			

## HABITAT SCORE

155

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI039-Van Campens Bk @ Depew Rec. Site Rd**  
**Date Sampled - 8/15/2001**

**Excellent** Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	5
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	50

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>



# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **Van Campens Bk (FIBI039) – 8/15/01**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE __6__ (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 0					
SCORE __6__ (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 0					
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE __10__ (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 0					
SCORE __10__ (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 0					
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE __7__ (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 0					
SCORE __10__ (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 0					

## HABITAT SCORE

186

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
SUB-OPTIMAL	110 C 159
MARGINAL	60 C 109
POOR	< 60

**FIBI040 - W Branch Papakating Cr. @ Rt 565**  
**Date Sampled - 8/21/2001**

**Excellent** Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous <b>Cyprinids</b> (I and BI)	5
Proportion of Individuals as Trout	*whichever gives better score
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

**Stream Rating**

<b>45-50</b>	<b>Excellent</b>
<b>37-44</b>	<b>Good</b>
<b>29-36</b>	<b>Fair</b>
<b>10-28</b>	<b>Poor</b>

# HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* **W. Branch Papakating Creek (FIBI040) –8/21/01**

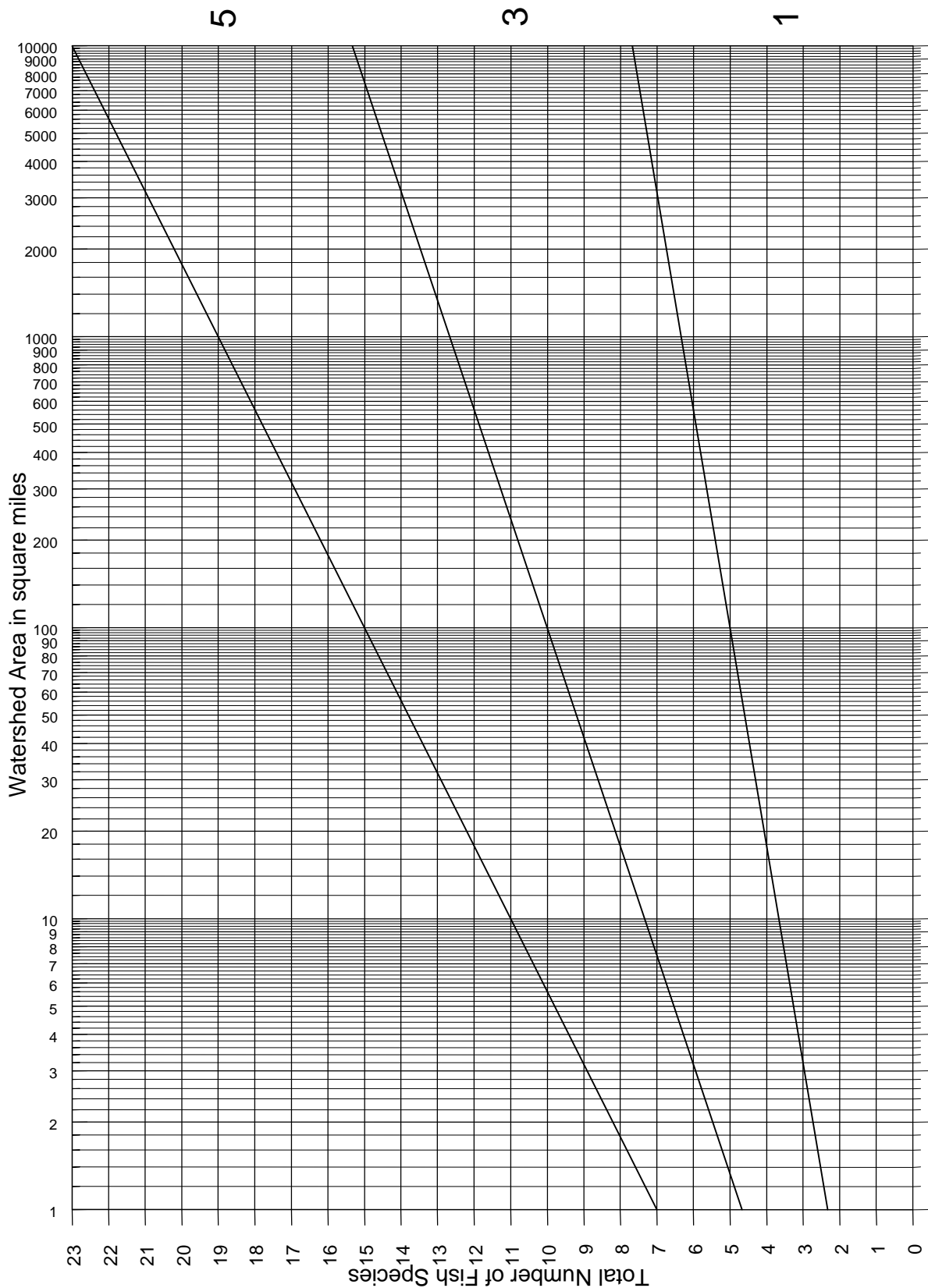
	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>6</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right Bank	10	9				8	7	6		5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>7</u> (LB)	Left Bank	10	9			8			6		5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right Bank	10	9			8			6		5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>3</u> (LB)	Left Bank	10	9			8	7	6			5	4				2	1	0			
SCORE <u>5</u> (RB)	Right Bank	10	9			8	7	6				4	3			2	1	0			

## HABITAT SCORE

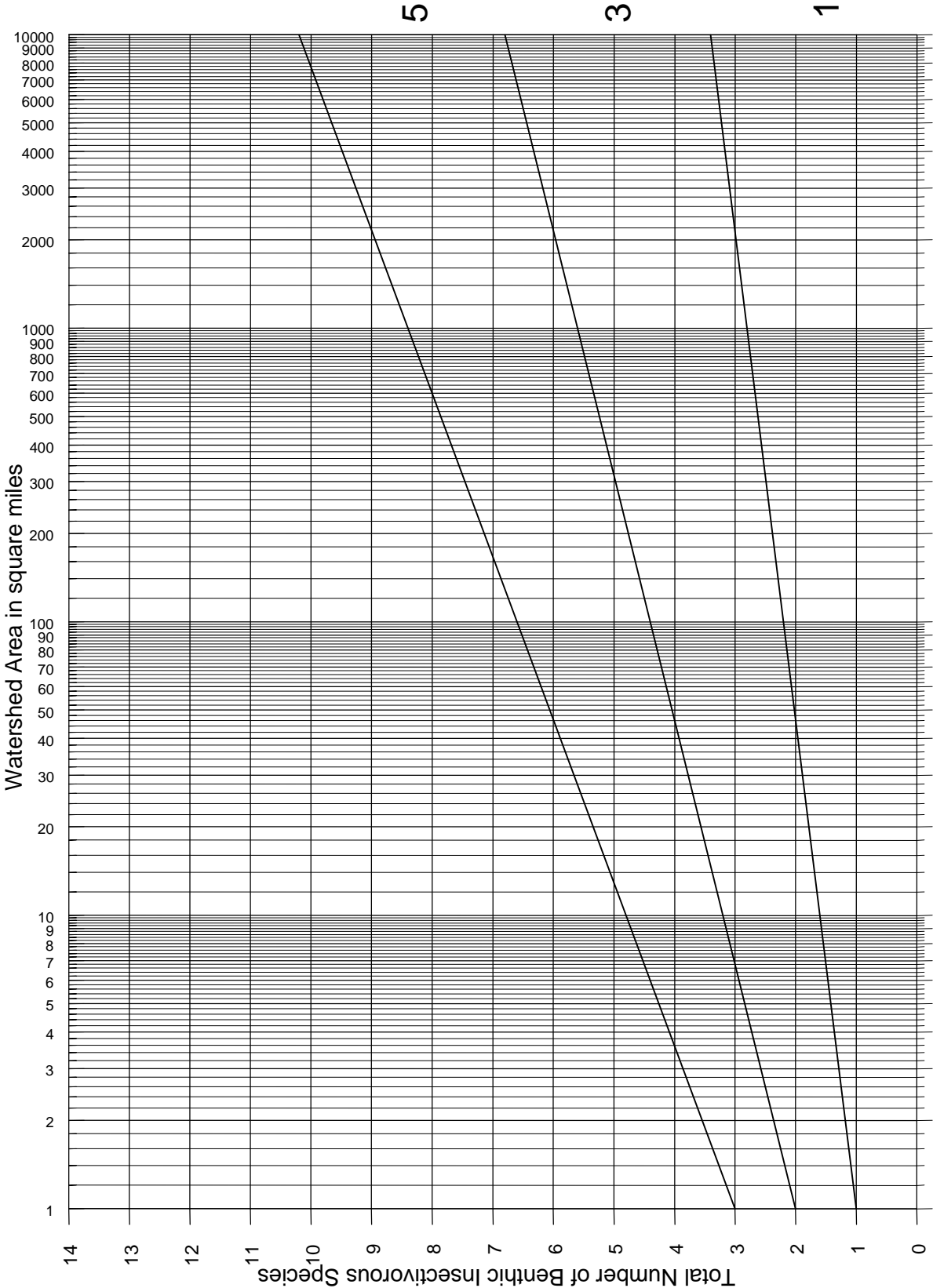
125

HABITAT SCORES	VALUE
OPTIMAL	160 C 200
<b>SUB-OPTIMAL</b>	110 C 159
MARGINAL	60 C 109
POOR	< 60

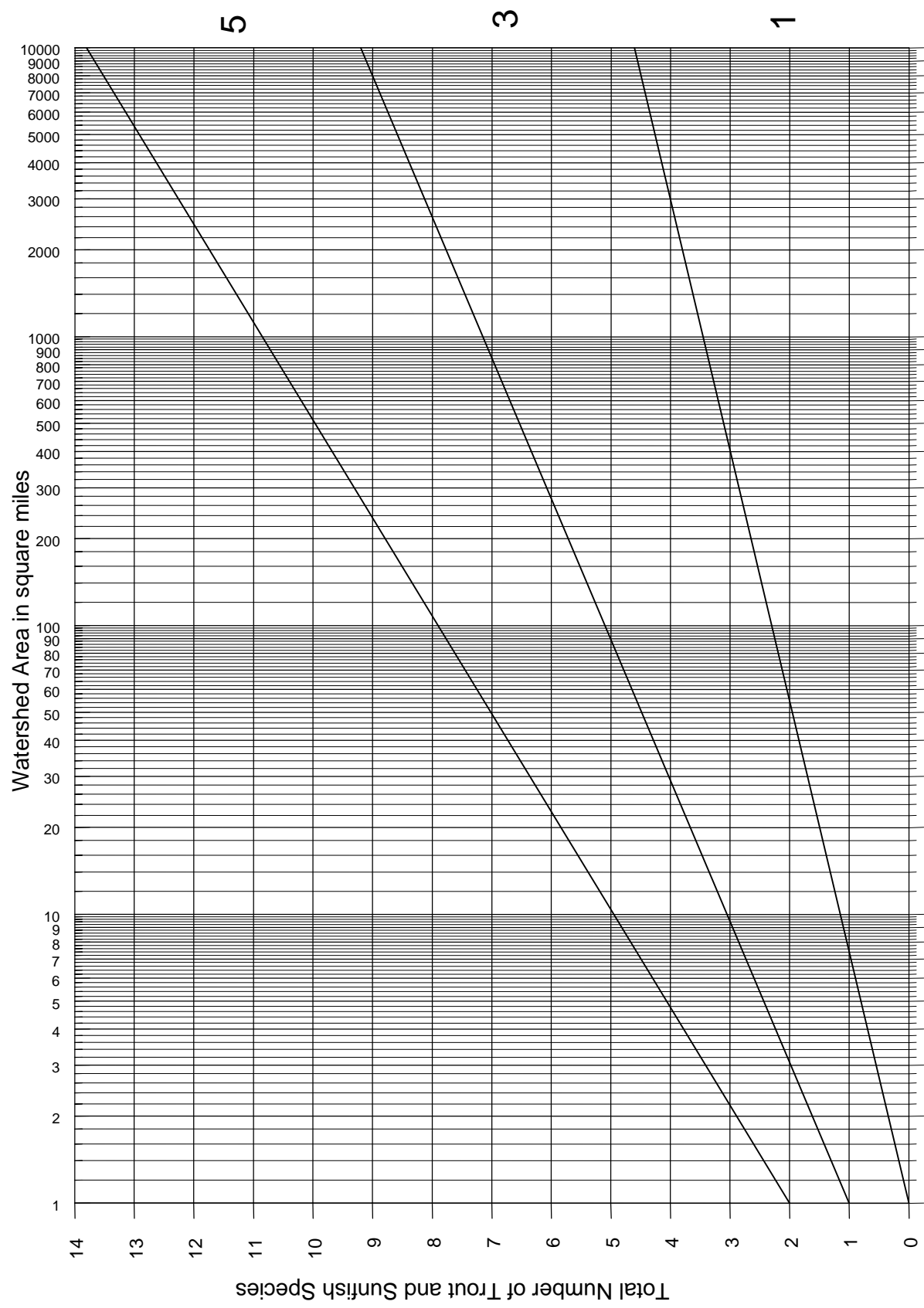
Total number of fish species versus watershed area for New Jersey ecoregion reference sites.



Total number of benthic insectivorous fish species versus watershed area for New Jersey ecoregion reference sites



Total number of trout and sunfish species versus watershed area for New Jersey ecoregion reference sites



Total number of intolerant fish species versus watershed area for New Jersey ecoregion reference sites

